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Historical Perspectives on Electricity Generation in Africa – Swedish Hydropower Constructions in Tanzania in the Era of Development Assistance, 1960s – 1990s

May-Britt Öhman, PhD in History of Science and Technology (Royal Institute of Technology, 2007)

Since 2009 Research fellow
Technoscience, Centre for Gender Research, Uppsala
University.

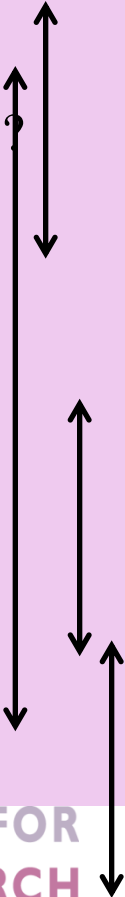
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Themes of the lecture

1. Some about me and my PhD thesis – Taming Exotic Beauties: Swedish Hydropower Constructions in Tanzania in the Era of Development Assistance, 1960s – 1990s
2. How can we know – and present - about why things are like they are today? –historical studies on generation of electricity (and the management of water resources). Archives and interviews. How to understand and write history about technology and science.
3. What is the desire of an engineer in regard to hydropower constructions? Energy generation? How important is it to construct something that works for an engineer?
4. Hydropower and production of electricity in Tanzania – some aspects.
5. Discussion (questions are of course welcome along the presentation too)





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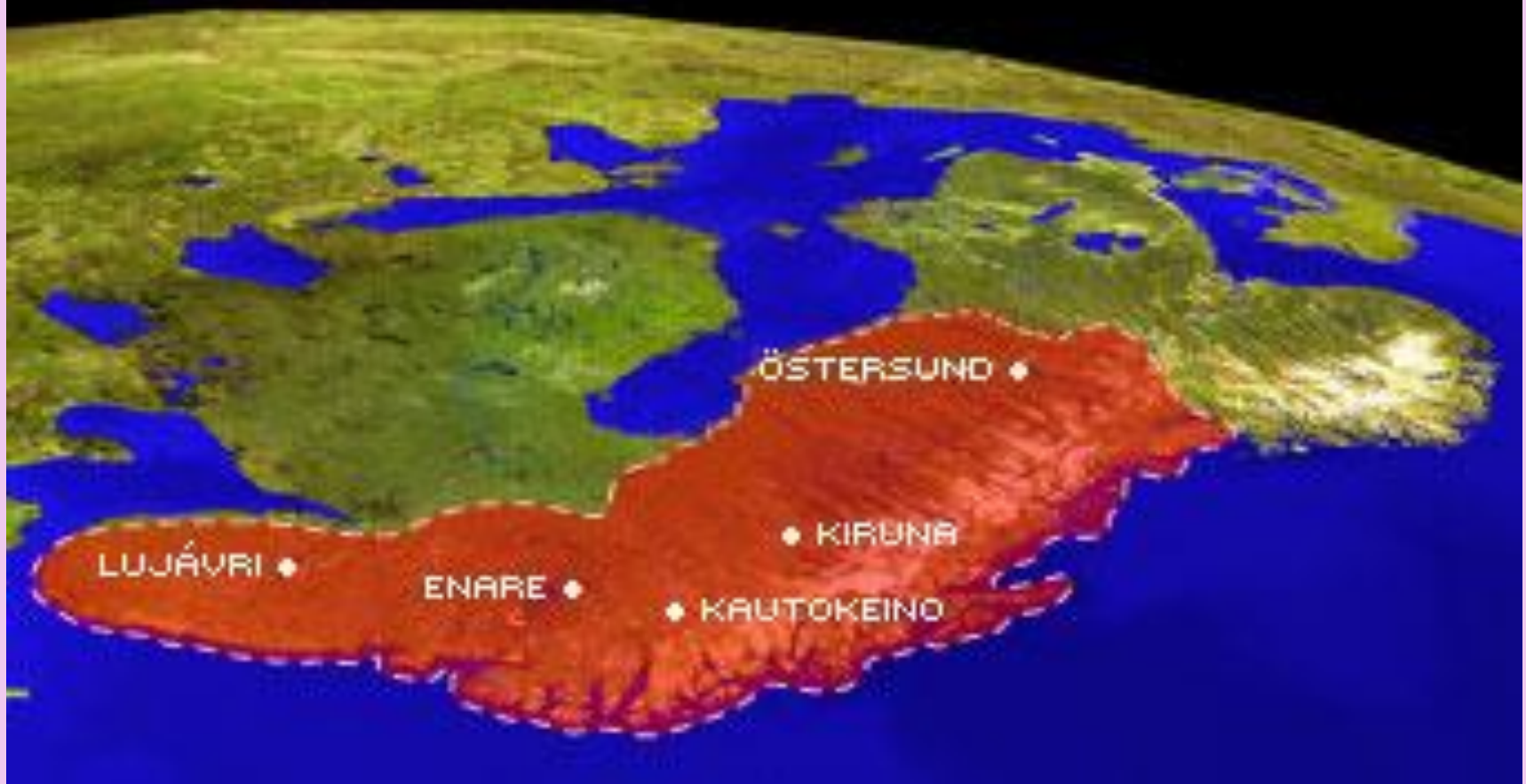
I am
Project leader of research project:
Rivers, Resistance, Resilience: Sustainable Futures
in Sápmi and in other Indigenous Peoples' Territories
(6MSEK, FORMAS, 2013-2016)

(Forest/Lule) Sami, from Luleå and Jokkmokk.
Member of board of the Sámi Cultural association Silbonah Samesijdda
(See www.silbonah.se)
Member of board of the National Association of Swedish Saami (SSR),
since 2011. (See www.sapmi.se)
And also deputy member of the Swedish Sámi Parliament since May,
2013. (See www.sametinget.se)

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Sápmi - Sameland



Sápmi, Sameland, viewed from the North Pole NOAA®.©ESA/Eurimage 1993. ©Metria 2001.
www.lantmateriet.se. Illustration: Pär-Joel Utsi/Nils-Gustav Labba

Turning perspectives – to empower myself. Illustration from the Swedish Sámi Parliament website. (Source:
www.samer.se)



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What is the desire of an engineer in regard to hydropower constructions?

Energy generation?

What do you yourself find important? And how can you achieve it?

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PhD thesis: *Taming Exotic Beauties: Swedish Hydropower Constructions in Tanzania in the Era of Development Assistance, 1960s-1990s* (Stockholm, 2007) available online

+ Article in journal Technology and Culture, July 2008: Heather Hoag and May-Britt Öhman

“Turning Water into Power: Debates over the Development of Tanzania’s **Rufiji River Basin**, 1961-2001.

Collaboration with Professor Heather J. Hoag, Univ. of San Francisco, who focused in her dissertation on the Rufiji River.

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To me, writing my PhD Thesis was like solving a riddle:

IF engineers desire to construct something that works.

IF development assistance is supposed to be helpful, to provide actual development...IF development assistance is something that we consider expensive use of money, then



How come

Sweden in 1970 ventured into a project of constructing a hydropower plant in Tanzania, at the cost of of 69 billion SEK in bilateral credits – the biggest credit ever in Swedish development assistance?

All this money was spent, but still the hydropower system has severe short comings and also negative impacts on environment, agriculture and health?

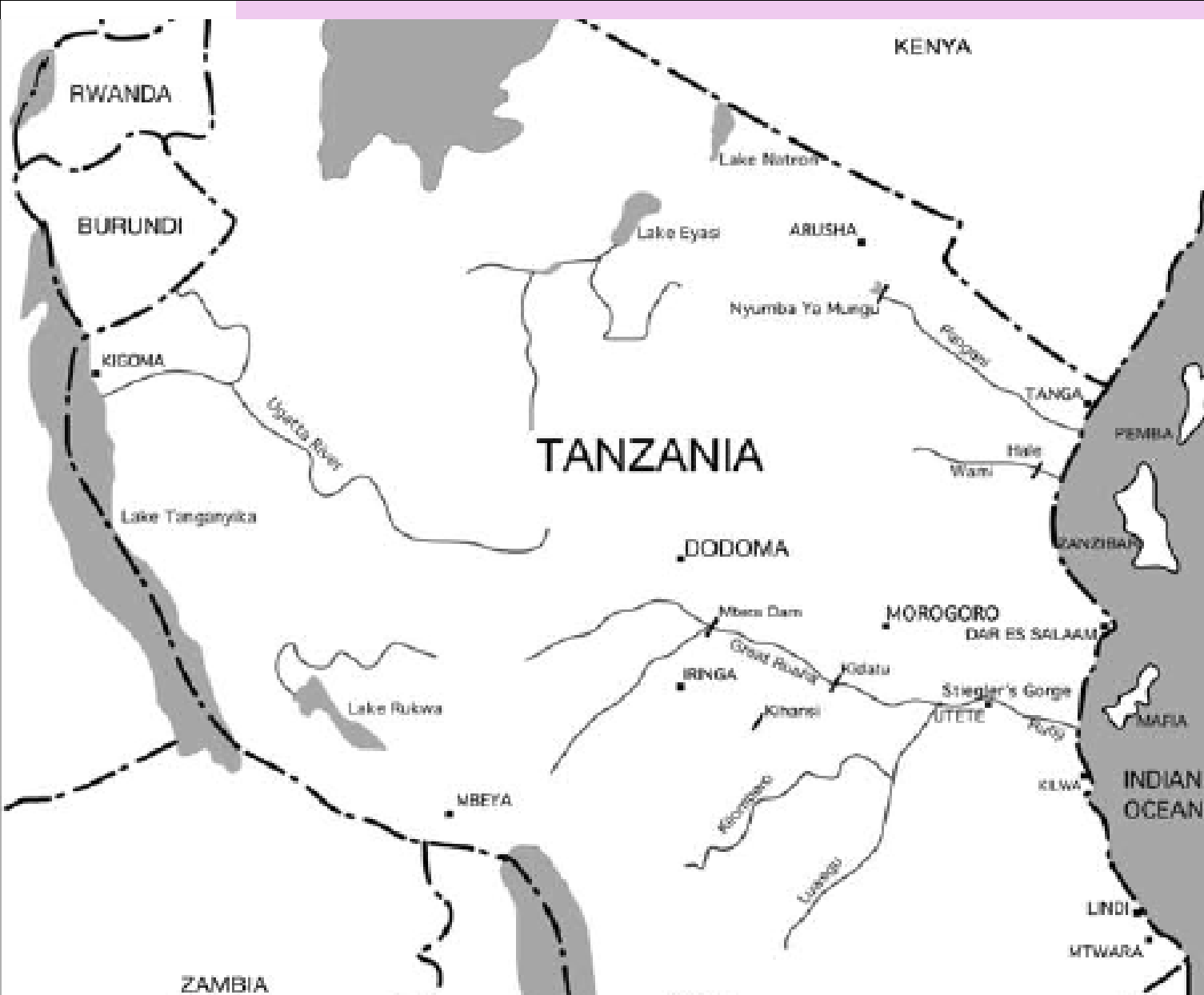
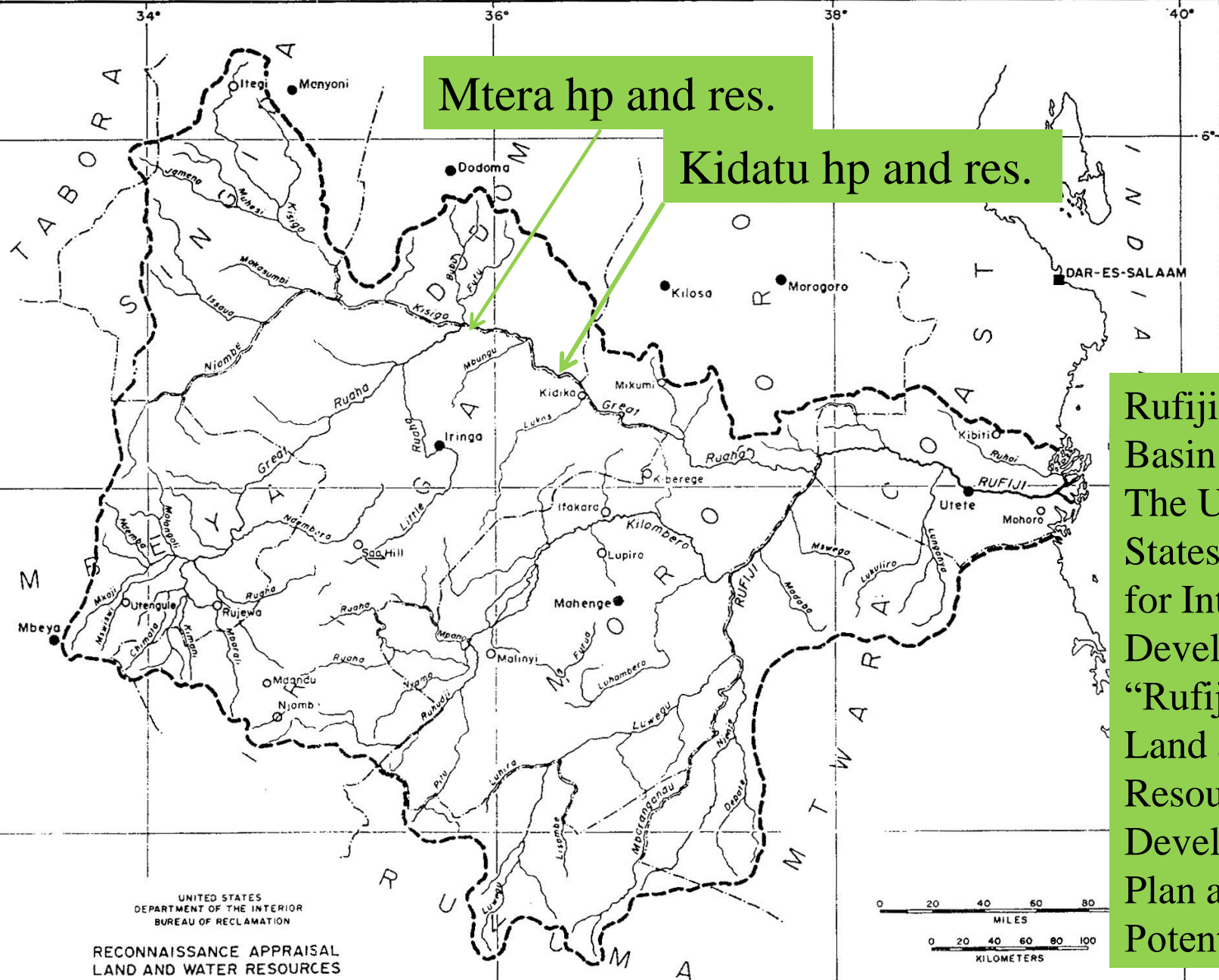


FIG. 1 Tanzania's main waterways and lakes. (Map by David Castro, reproduced with permission.)



Mtera hp and res.

Kidatu hp and res.

Rufiji River Basin. *Source:* The United States Agency for International Development, "Rufiji Basin: Land and Water Resource Development Plan and Potential," 1967.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

RECONNAISSANCE APPRAISAL
LAND AND WATER RESOURCES
RUFJI RIVER BASIN
TANZANIA
EAST AFRICA

0 20 40 60 80
MILES
0 20 40 60 80 100
KILOMETERS



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Research projects after my PhD thesis:

PostDoc project 2009-2010 (Perspectives on hydropower exploitation along my own river, the Lule River)

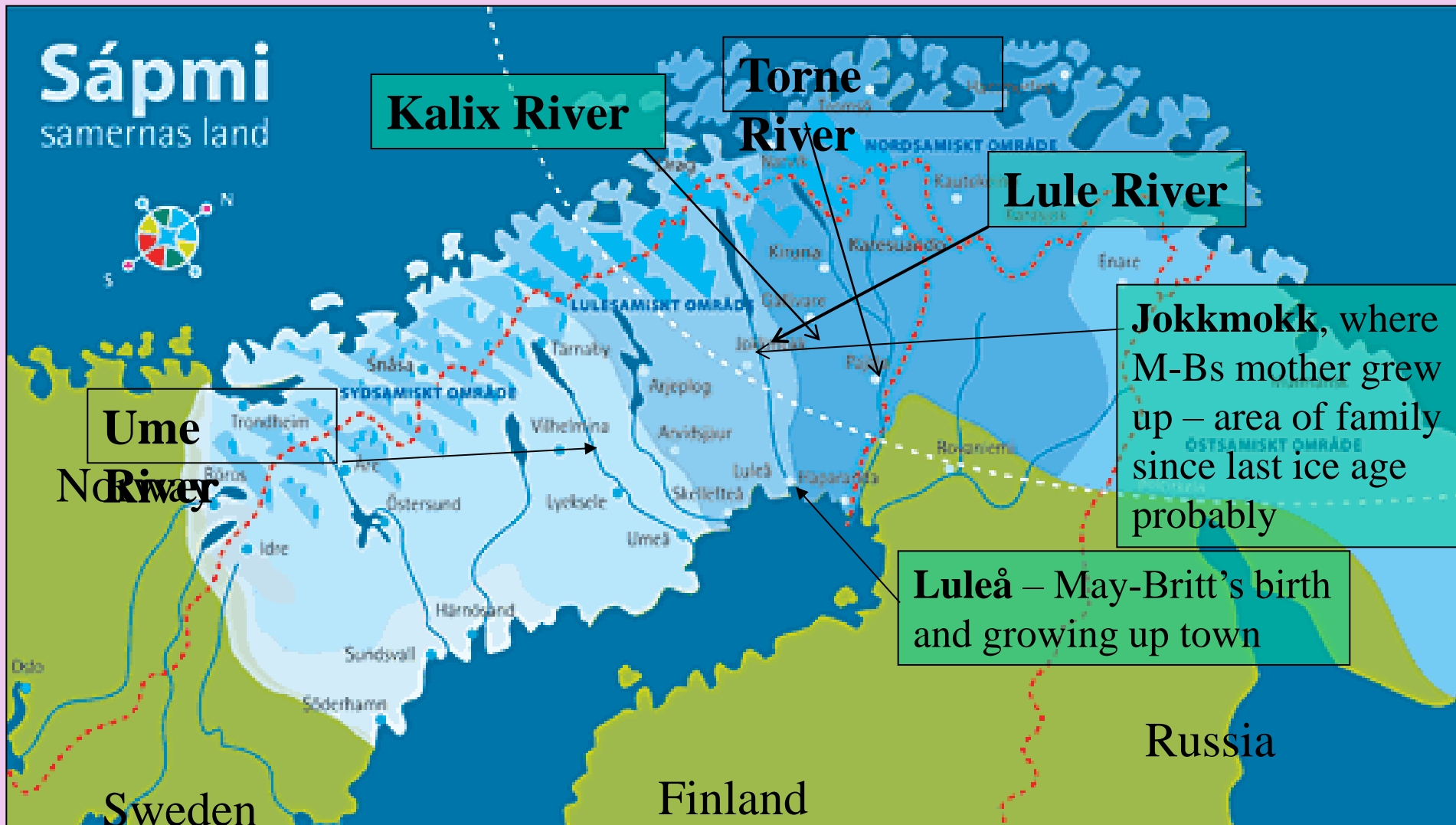
Research project 2010-2012 (Dam Safety on hydropower exploited rivers – focus on Ume river and Lule River)

Currently 2013-2016 “Rivers, Resistance, Resilience: Sustainable futures in Sápmi and in other indigenous peoples’ territories” – 4 rivers in Sweden in focus – including the Lule River.

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Source: www.samer.se



Sápmi – colonised territory – by the (Swedish) state; mining, hydropower, windpower, forestry, military training and test areas.



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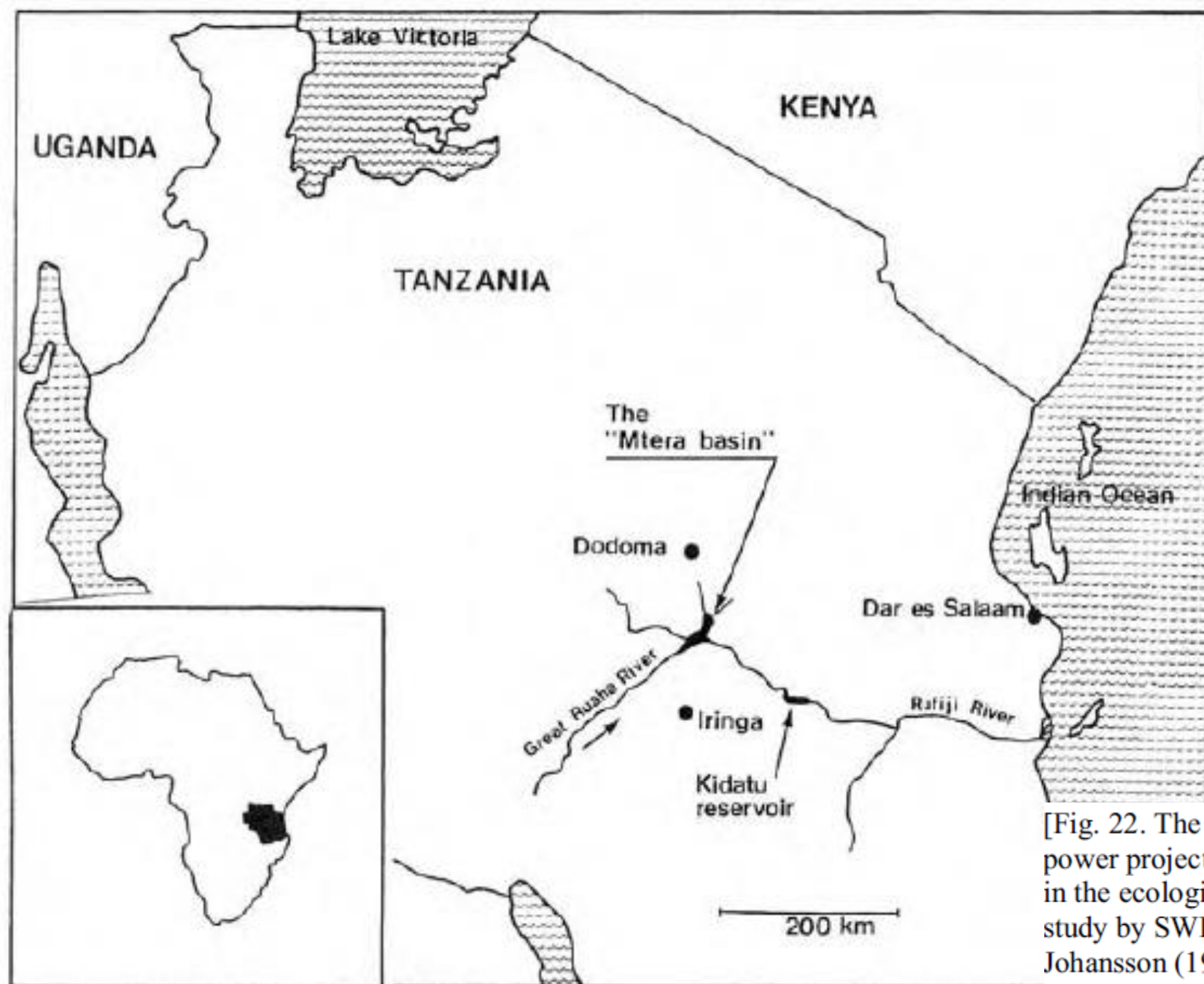
Tanzania and the power production

What was the situation before independence (1961) and at the time of independence?

How has it changed, and how is the change related to the transfer from colonial era to the development assistance era?

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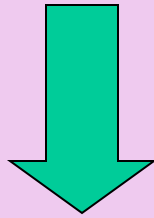


[Fig. 22. The Great Ruaha power project as presented in the ecological impact study by SWECO in Johansson (1997)]

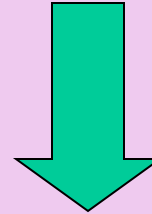
The Rufiji Basin Survey, FAO (UN Food and Agriculture Organisation), **1955-1961** – introduced by British colonial power

NORWAY^f

from early
1970s



Tanzanian
Independence in
1961



SWEDEN
and the
World Bank

**The planning of
Stiegler's Gorge
Dam, 1961 - 1984**

Plans shelved in
1984 –but still on
Tanzanian govt
wishing list

**The Great Ruaha Power
Project, 1965-1988:**

Kidatu hydro power station and
dam, 1970-75

Mtera dam, 1977-1980

Mtera hydro power station 1984-
88



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The Rufiji Basin Survey – focus on water AND electrification

In 1961 a survey of the Rufiji River Basin was published. After the huge failure of the ground nut scheme, which was an attempt to agricultural modernisation through mechanization in the Rufiji valley, the British colonial government wanted to go ahead with irrigation schemes for agricultural development. At this point the British governor turned to the FAO, the Food and Agriculture Organisation of the United Nations, with a request for a study of the water resources of the Rufiji river basin.

A deal was closed between Tanganyika and FAO in 1955, and a study was initiated with the purpose to produce a scientifically based multi-purpose project.

The aim was to develop the river basin through flood control, irrigation and economic development.

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At independence (1961) –

The Tanzanian government wished for development of electricity generation AND management of water resources – for irrigation to the agriculture.

However, as Swedish development assistance and engineers entered the focus on single purpose hydropower – ignoring agriculture.



The British dominance in the power sector was replaced by Swedish dominance.

With this followed a focus on single purpose hydropower –

Focus on electricity generation only.

Also – earlier knowledge produced by British colonial officers was disregarded.



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Why do you think this happened? Why did the Swedish engineers and development assistance focus on power production only?

Suggestions?

Thoughts about the consequences?

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OPINION



The consequences of the choices and decisions made: power production does not function in Tanzania

Power problems: Mkapa's administration to blame

[Fig. 40. Picture and headline from a Tanzanian newspaper, during the load shedding in November 2000. The African, Nov. 28, 2000]



[Fig. 41. Diesel driven generating sets – the noisy back up system to the electric grid in use during load shedding in Dar es Salaam, Nov. 2000. Photo: the author.]

Tanzania: Tanesco Announces Ten Day Power Interruption

BY BASHIRI KAGOI, 16 NOVEMBER 2013

RELATED TOPICS

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AdChoices

THERE will be power interruptions starting today (Saturday) until November 26 this year and all regions connected to the national grid including Dar es Salaam will in one way or the other get affected except the regions which are out of the national power grid.

The Public Relations Officer of the national power utility, (TANESCO), Ms Badra Masoud announced the interruptions at a press conference in Dar es Salaam yesterday.

It was announced that various places would experience the inconvenience at different times due to a massive maintenance of the gas plant at Songosongo in Kilwa District, Lindi Region, owned by Pan Africa Company that provides 245 MW to TANESCO.

According to Badra, completion of the maintenance work of the gas plant at Songosongo would improve supply of electricity from the natural gas driven turbines at Ubungo area and Songas plant that provide 182 MW. She underscored the need for improvement of alternative sources of energy such as oil and water for hydro power production rather than depending on gas only.

It was explained that Tanesco was informed by Pan Africa Company two months ago about the intended maintenance of Songosongo gas plant. The national grid zone include Dar es Salaam, Tanga, Kilimanjaro, Arusha, Dodoma, Morogoro, Shinyanga, Mwanza, Mara, Mbeya, Iringa, Tabora, Singida, Manyara and Zanzibar. All regions not connected to the national grid will not be affected in the specified period.

News from
Nov. 2013

INFOCUS: Tanzania »



respects to ...

Tanzania Mourns Former
Party Registrar
President Jakaya Kikwete
the nation in paying their la



Mnyika has urged ...

Tanzanian Govt Under Fire
Over Power Prices
Member of parliament for
Ubungo constituency John



Collaborative ...

Poor Sanitation Claims
Hundreds in Tanzania
According to a report by
Water Supply and Sanitatio



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How could this happen?

Why didn't the efforts lead to the functioning energy system in Tanzania?

With such a big investment in development and constructions of hydropower?

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What kind of knowledge is of importance when constructing a hydropower plant?

Suggestions?

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Single purpose

Placement of reservoirs

Ignorance of evaporation

British colonial knowledge about sedimentation,
and importance of agriculture, was ignored.

...

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Quote from letter by Swedish engineer working for Sweco, sent to the Swedish development agency, regarding the construction of the Mtera dam, in 1972:

“With its almost complete draw-down and consequent wide muddy shoreline, Mtera reservoir will be of little or no use for fisheries, for settlement or for watering animals, stock or game. Except very occasionally when full, the dam will not even be attractive to look at. Altogether therefore Mtera dam seems justified only to justify the development of Kidatu to its full 200 MW capacity: altogether Mtera dam will be wasteful of water resources and wasteful of good fertile land, 600 km². – an area the size of Bahi swamp and just as wasteful. Large as it is Mtera dam will not even contain the largest floods which is experienced every 5-6 years. Some alternative to Mtera must be found even if it is more expensive.”

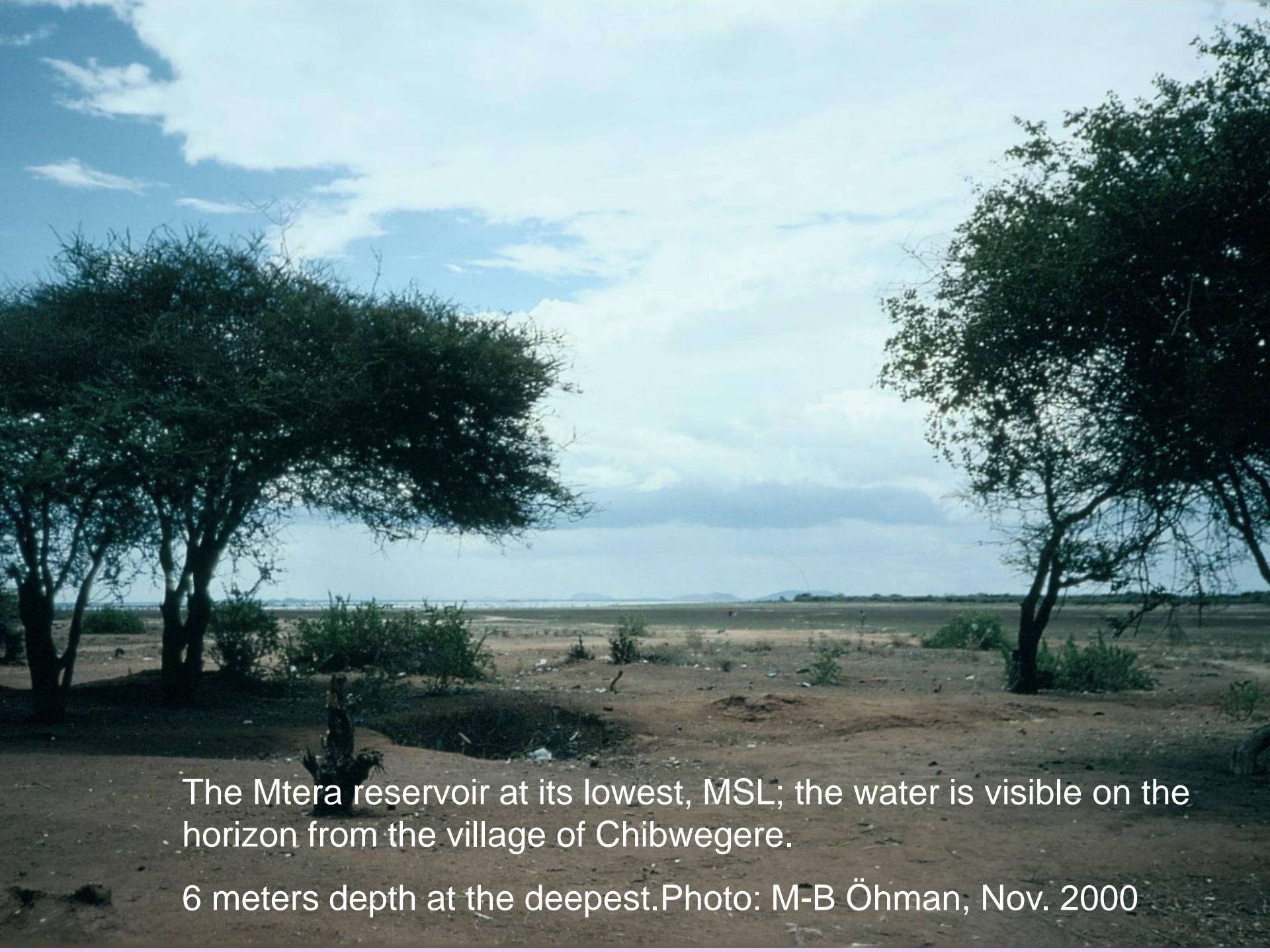
SNASA F1AB 1393: Copy of confidential letter from Mr. Buchanan to Devplan/ Letter from Stig Regnell, SIDA, Dar es Salaam, to SIDA, Stockholm, 19720223.

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Mtera reservoir – at MSL (minimum storage level)
November 2000. Photo: M-B Öhman



The Mtera reservoir at its lowest, MSL; the water is visible on the horizon from the village of Chibwegere.

6 meters depth at the deepest. Photo: M-B Öhman, Nov. 2000

While the first letter was unofficial and confidential, the views of Buchanan became an official viewpoint of the Ministry of Water Development and Power when a letter was sent to the Tanesco General Manager, claiming that Tanesco had no authority whatever to limit abstractions of water upstream of Kidatu (as stated in the 1970 loan agreement for the Kidatu power station). Furthermore, in the official letter signed by Buchanan – of which copies were sent to SIDA and SWECO representation in Dar es Salaam – he stated that the development of the Great Ruaha power project would imply freezing the possibility of agricultural development in an area of 26,000 square miles – or a twelfth of Tanzania's land area. Buchanan also met the resident SIDA engineer in Dar es Salaam, Stig Regnell, who reported back to SIDA in Stockholm on the objections and acknowledged that the criticism seemed to be of great importance. Regnell took the criticism seriously and wrote to SIDA in Stockholm that it would be necessary to change the plans for the Mtera reservoir:

Öhman, 2007, p. 228.

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So warnings were made.

The malfunctioning – how can it be explained?

Stupid Swedish engineers?

Stupid Tanzanian authorities?

Or something else?

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Technoscientific paradigm:

Swedish state supported experience and understanding of hydropower construction was on power production only – all other interests have throughout the 20th century been disregarded. People along the rivers, including the Sámi, have been ignored.

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Swedish technoscientific paradigm – transferred to Tanzania

Contains the view of largescale hydropower plants as being equal to progress

The territory for hydropower exploitation is considered state property and free for the state to exploit for the "greater benefit" of the nation

"Invisibilisation" /(Osynliggörande) of local inhabitants/indigenous population within the territory in question

Actual denial of the rights of the local inhabitants/indigenous population in the territory

Colonialism – exploitation of territory

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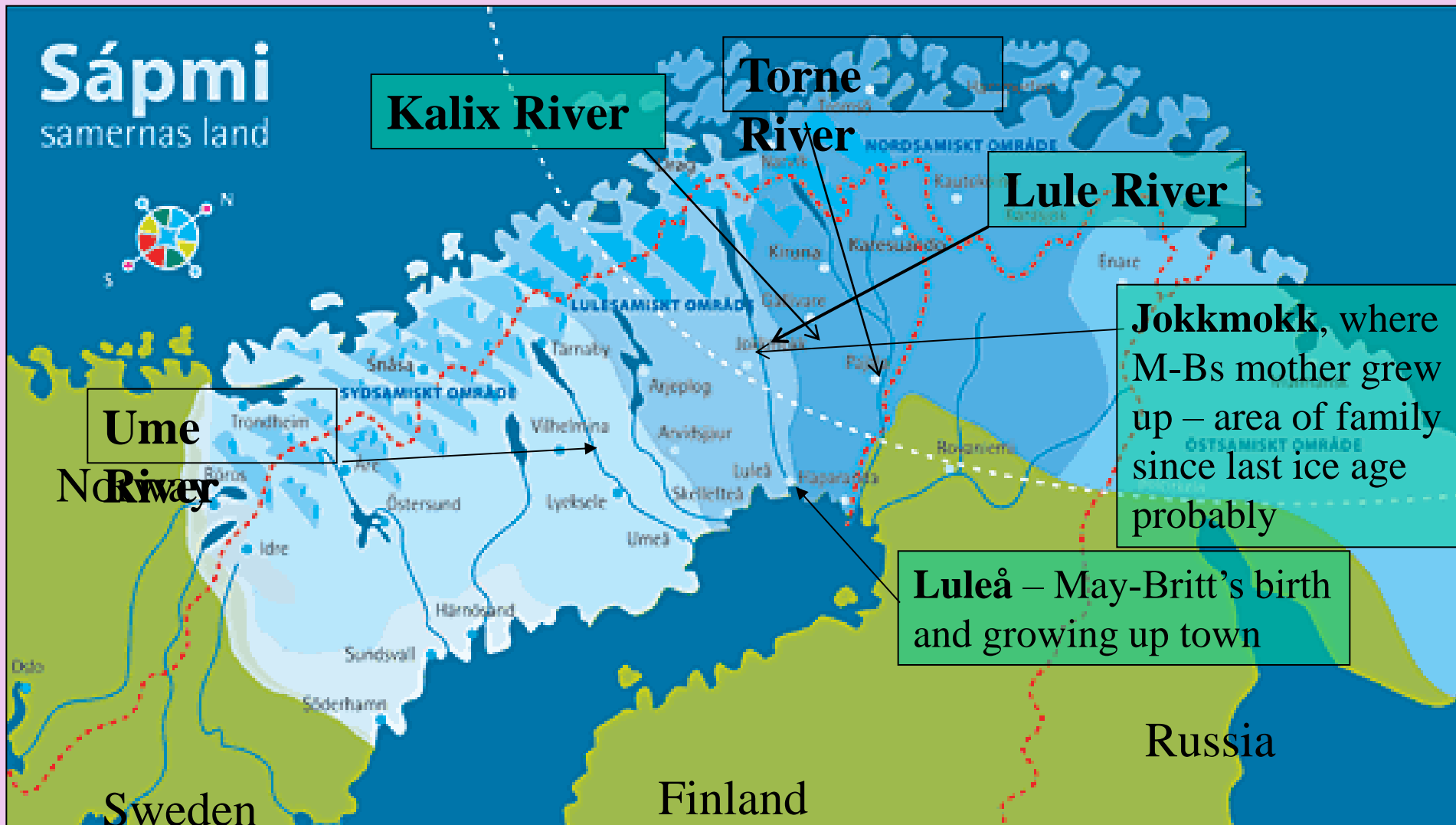
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Swedish internal colonisation

Sapmi – a colonized territory by the Swedish state

The hydropower exploitation of Sapmi in the 20th century – a continuation of the colonization

Source: www.samer.se



Sápmi – colonised territory – by the (Swedish) state; mining, hydropower, windpower, forestry, military training and test areas.

The Lule River



The most hydropower exploited river in Sweden – no more a river but a stair case of reservoirs. Producing a third of all Swedish hydropower generated electricity or 44% of all electricity by the Swedish Power Company owned by the State) Vattenfall.

Kutjaure: a non-regulated mountain lake
summer residence (April/May-September/October) for
reindeer herding Sami, "refugees" from the Suorva dam
regulation 1972. Thus – a normal mountain source lake to the
Lule River. Photo: May-Britt Öhman 2006



Maria Utsi, Kutjaure, "refugee" from Suorva dam regulation - with daughter and granddaughter and cousin to granddaughter. Interview in 2006.



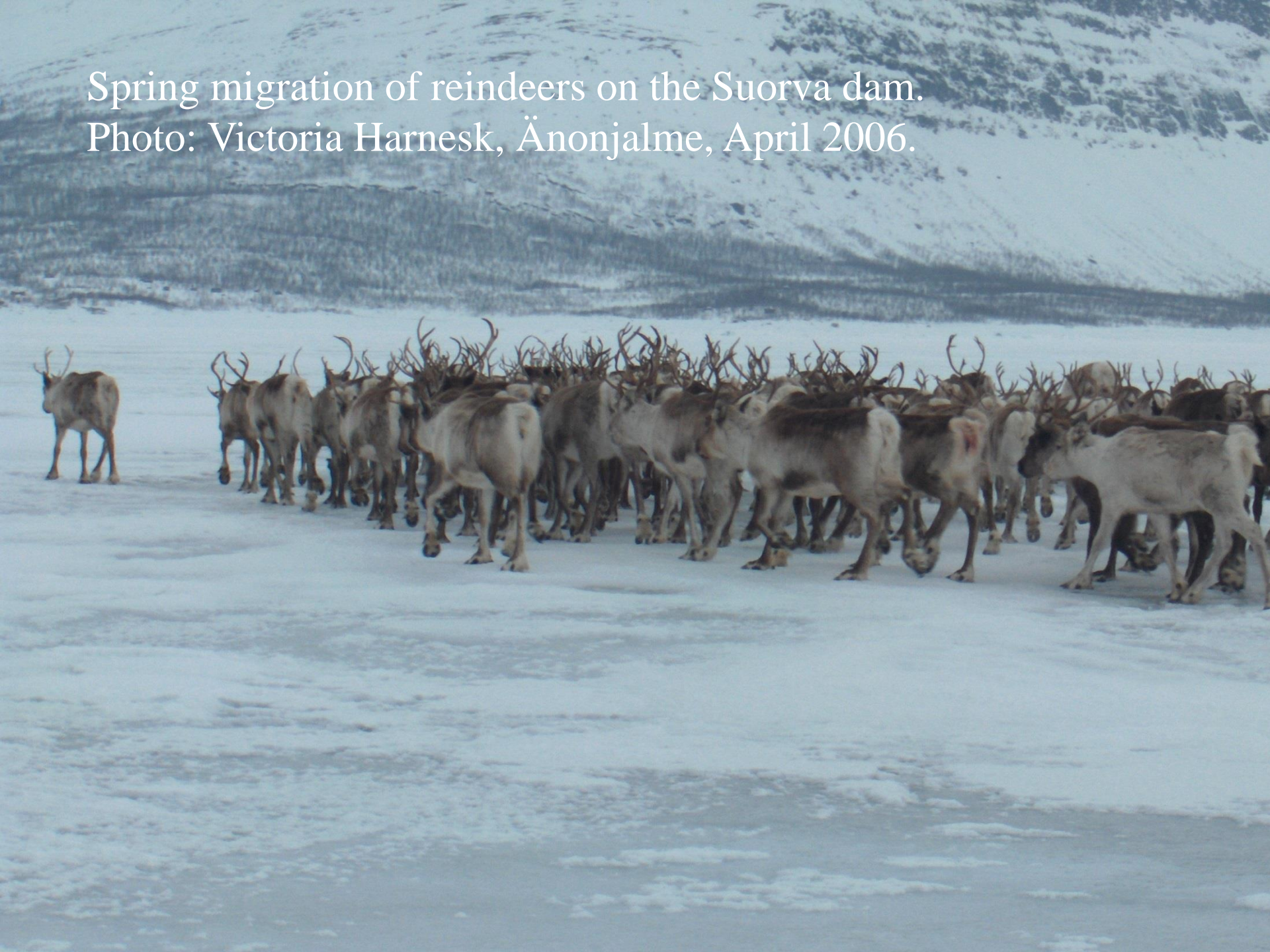
The Suorva Dam – seven mountain lakes
turned into an inland sea in four steps: 1919,
twice in the 1940s, and 1972-73.

Regulation levels up and down
30 meters after regulation
1972

Largest reservoir in Sweden (and
North of Europe)

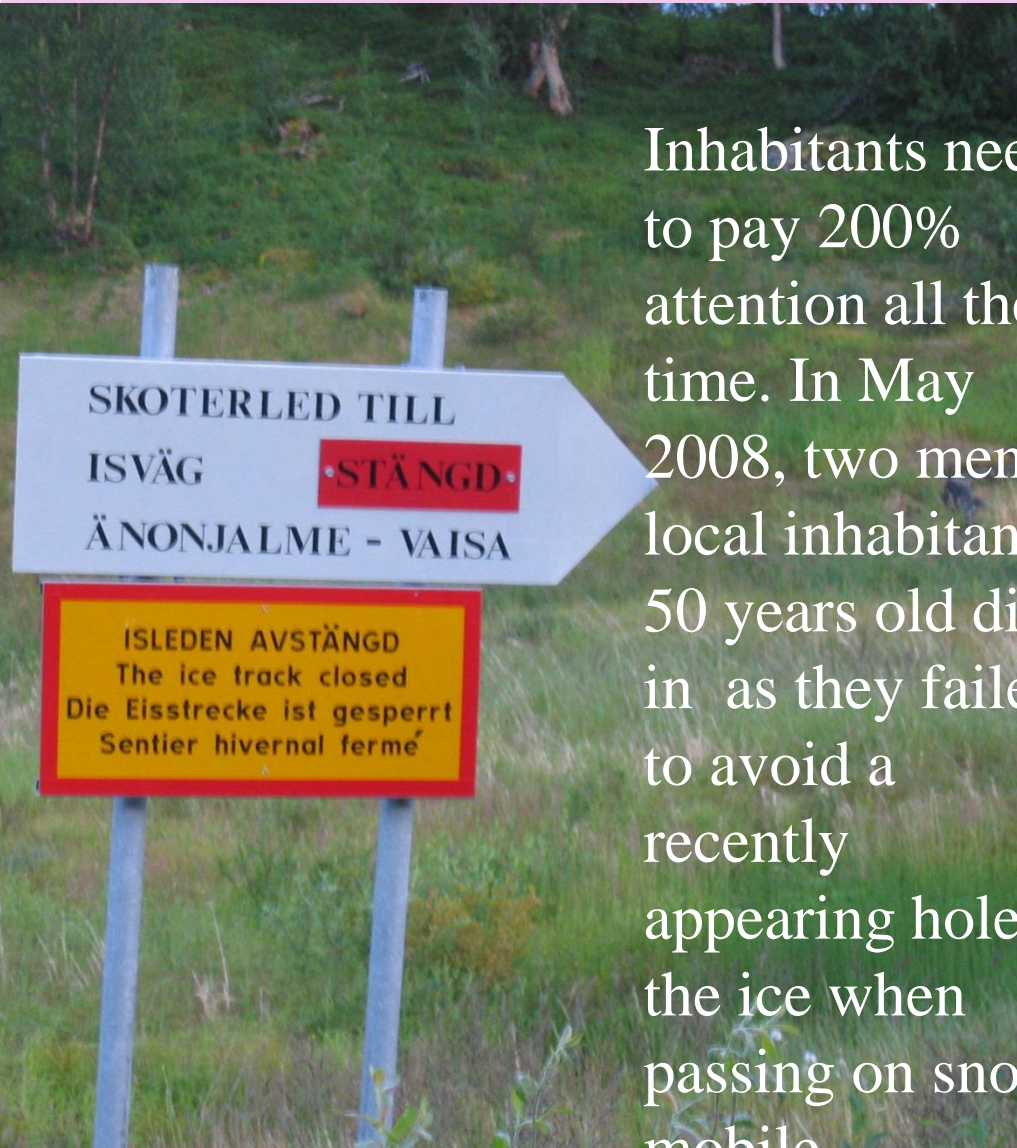


Spring migration of reindeers on the Suorva dam.
Photo: Victoria Harnesk, Änonjalme, April 2006.



The ice, due to regulations, is extremely risky. During tourist period, the power company Vattenfall pays the cost for the maintenance of a ice track between Ritsem – Änonjalme/Vaisa.

However, once winter season tourists are gone, May 1st, the ice track is no longer supervised.



Inhabitants need to pay 200% attention all the time. In May 2008, two men, local inhabitants, 50 years old died in as they failed to avoid a recently appearing hole in the ice when passing on snow-mobile.

The shore at Änonjalme

Suorva Reservoir, Photo:
M-B Öhman



Erosion of shore line is increased due to high level of water in the reservoir in combination with storms in fall (storms become more powerful as a consequence of the large open area of water) Photo: M-B Öhman





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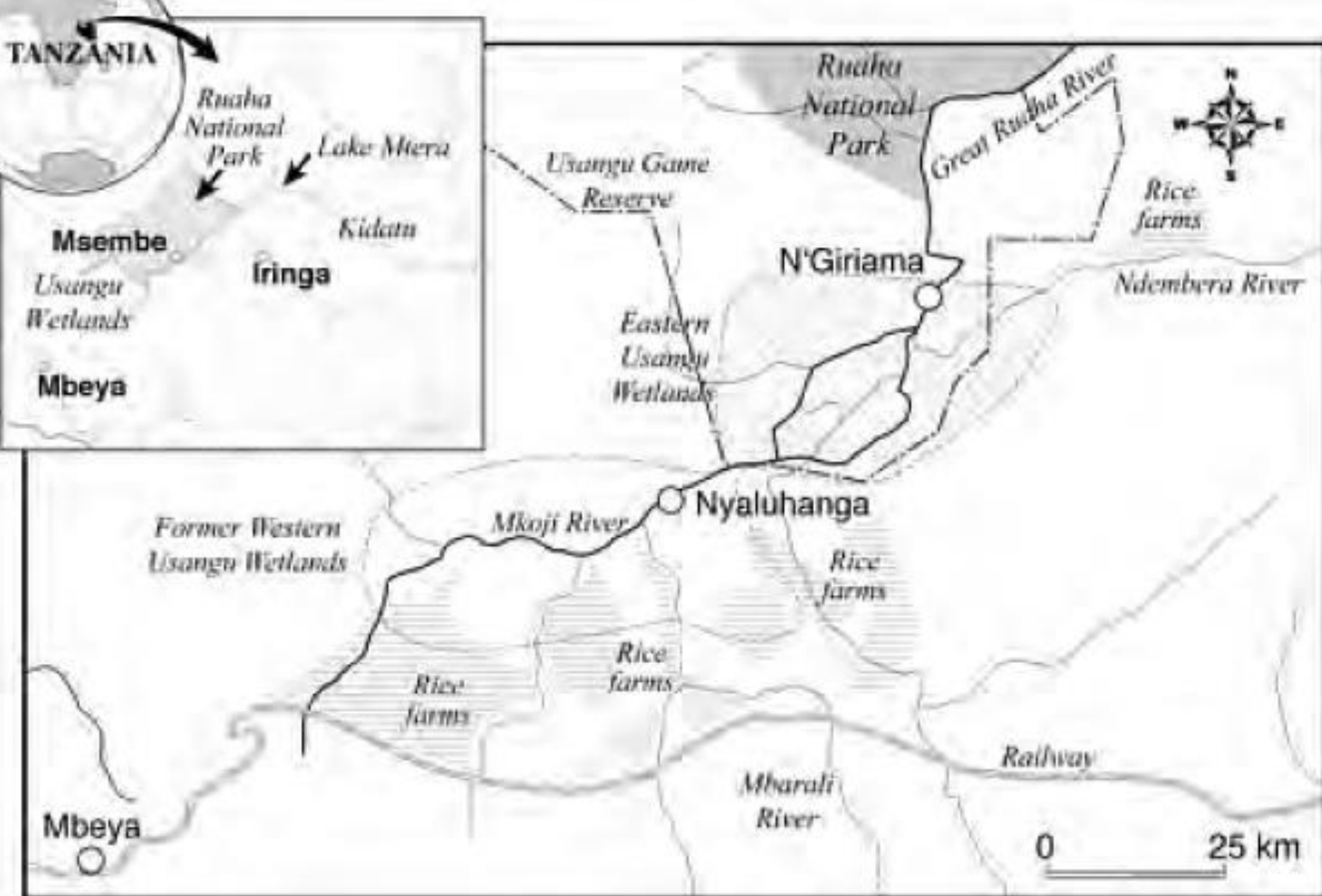
Let's return to Tanzania

Today,

Problems with both water resource management
AND electricity generation.

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[Fig. 42. Map of the Usangu plains, the Southern Highlands of Tanzania, part of the Great Ruaha River catchment area. This map, from 2006, shows the location of rice farms, competitors for the water flowing into the Mtera reservoir. The inset is a location map of the Great Ruaha River, and how it flows into the Mtera— here called “Lake Mtera”. Source: Mtahiko et al.]



The problems with power production is often blamed on the competing usages of waters.

But – what about evaporation, sedimentation, operation of the hydropower plants and reservoirs?



Some glimpses into my PhD thesis work

- How to write history about science and technology
- And a continuation of the solving of the riddle.
Why this happened.

ARCHIVAL SOURCES

Swedish national archive, Stockholm:

SIDA/Sida archive:

- F1AD 890 (On export promoting assistance to Tanzania)
- F1AD 895-897 (Correspondence and reports regarding the Great Ruaha power project, 1971-1977)
- F1AG1 224-242 (Cooperation with the World Bank, 1966-1984)
- F1AB:45 "Ekonomisk administration" finished June 30, 1972.
- F1AB: 1068,1069 (Sveriges Radio, högfjällshydrologi m.m. 1965-70)
- F1AB 1229, 1230 (Consultancy contracts, Finansieellt bistånd)
- F1AB 1387-1393 (Correspondence and reports in relation to Wami and Great Ruaha power project, 1966 - 1972)
- F1AD 912 (Tender documents for Tanesco, Great Ruaha Power Project, Mtera Power plant, 1983)
- F1AB 1405-1414 (Correspondence and reports regarding water provisioning projects in Tanzania, 1965-1971)
- F6A 97-102 (Studies on the Pulp and Paper Mill, Tanzania. 1969-1977)
- B1B 1 (Administration, Petita 1966-1969)
- A91, A1a. Styrelseprotokoll, GD-protokoll, övriga protokoll. 1965 juli-dec.
- A1A:2 Styrelseprotokoll, 1966-1968, Vol. 2, 9:11.
- F6A:1 Biståndsverksamhet kapitel 3-4, 1965-1971.
- F6A: 2A Biståndsverksamhet Kap. 5. 1965-1972.
- F6A:2B, Biståndsverksamhet Kap. 5, 1965-1972.
- F6A:3, 1968, 1 VIE 02, 1 VIE 03.

NIB archive:

- A I: Styrelseprotokoll 1962-30.6.1965
- A II: Generalsekreteraren protokoll 1962-30.6.1965
- A III: Utskottsprotokoll 1962-30.6.1965
- Vol. 108, P.1. Tan 2/23.0, Fältprojekt. P 1.Tan. 2/23.1962-1965.

The Swedish institute archive

- Serie 2709,2. Vol- C109;Vol C110 Centralkommittén, U 50, U 51, Allmänt ang. insamlingsverksamheten
- Arkiv nr 2710, Aktionen Sverige hjälper. Seriesign F2; Vol 1-7, 1955; Vol 8-36, 1961
- Arkiv nr 2710, Centralkommittén för svenskt tekniskt bistånd till mindre utvecklade områden. (CK), Seriesign F1, Vol C1 - C170.
- Arkiv nr 2711, Nämnden för Internationella expert- och stipendieärenden, Vol. B:1-B:6 (- B:15)- Centralkommittén, Insamlingsutskottet, för "Sverige Hjälper", A1 Allm, Protokoll, 12.12.1960-1/6 1961

SWECO archive, Stockholm

- 11576: (Tanzania Wami River Power Development, Study of hydro electric potential of the lower Wami for the Swedish International Development Authority, (SIDA) Stockholm, October, 1966)
- 13889: (Comparative Study of the Wami River and The Great Ruaha River Developments in Tanzania, Joint Report, SWECO – Balfour, Beatty & Co, Ltd. July 1968)
- 26757 GRPP Mtera Power Project and Kidatu Power Plant Stage II, film Oracle 238

TanESCO Archive, Dar es Salaam,

- Loan Number 1306 T-TA, Loan Agreement (Kidatu Hydroelectric Project – Second Stage) between United

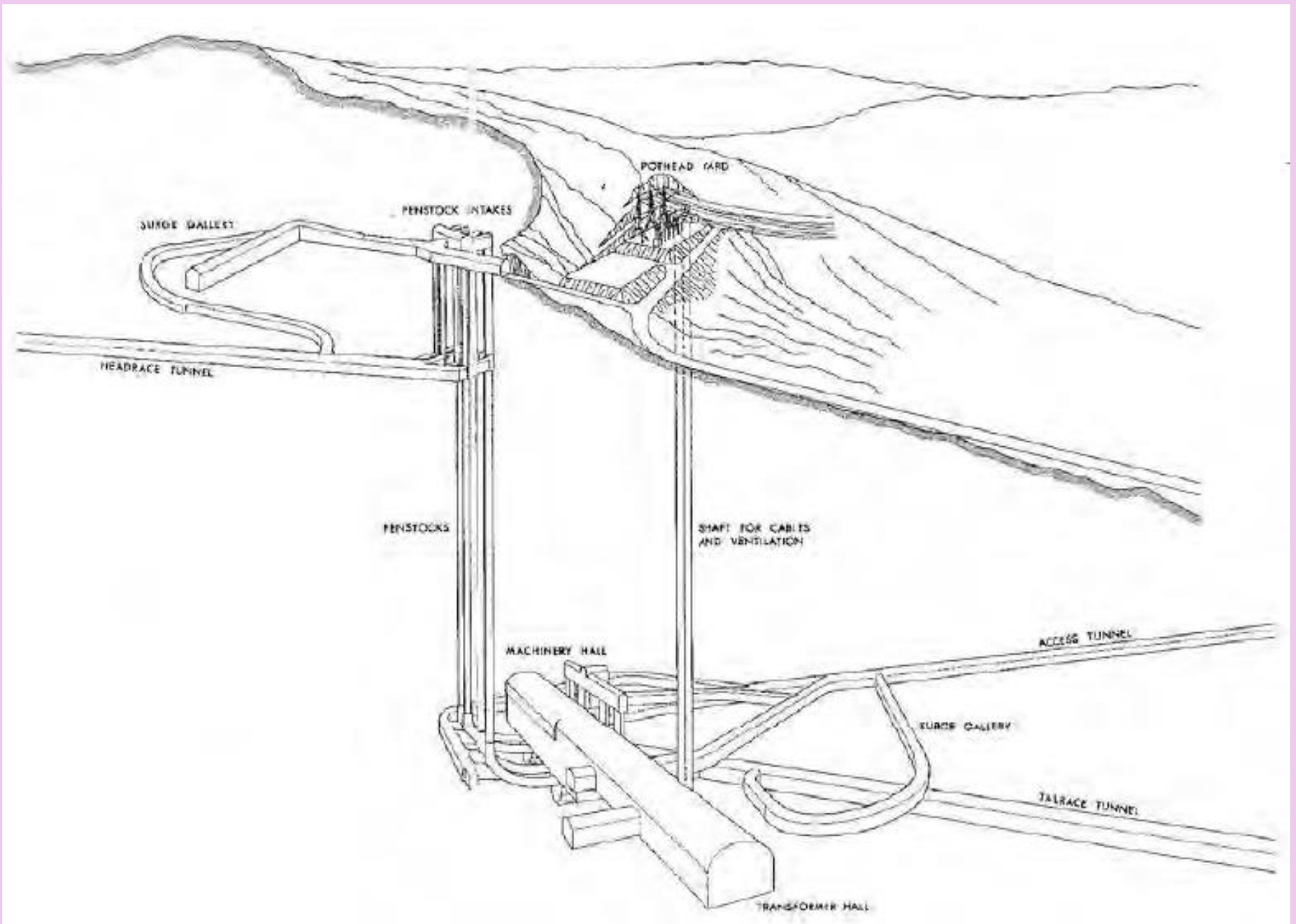
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Mr Vincent T. Gondwe, Pers. interview, Dec. 4, 2000, Dar es Salaam, Tanzania
Ms Florence Gwang'ombe, Pers. communication, Nov. 16, 2000, Kidatu, Tanzania
Mr Arvid Hardmark, Telephone communication, Mar. 27, 2002 (Stockholm), Sweden
Mr Elias Nicklas Helile, Pers. interview, Nov. 17, 2000, Chibwegere, Tanzania
Mr Sixten Heppling, Pers. interview, Feb. 16, 2000, Stockholm, Sweden
Mr Kjell Isaksson, Pers. communication, June 21, 1999, Porjus, Sweden
Mr Ingvar Jernelius, Pers. interview, Oct. 13, 2000, Stockholm, Sweden
- Pers. interview, Feb. 7, 2002, Stockholm, Sweden
Mr Karume Juma, Pers. communication, Nov. 17, 2000, Chamusile landing station, Tanzania
Mr Lars Kalderén, Pers. interview, Apr. 12, 2002, Stockholm, Sweden
Mr Bo Liljedal, Telephone communication, Feb. 16, 2004, (Stockholm-Örebro), Sweden
Mr Sten Lööf, Pers. interview, October 10, 2000, Stockholm, Sweden
Mr Mafuru, Pers. interview, Nov. 17, 2000, Mtera, Tanzania
Mr Magomba Meshack/Mr Abbasi Mwendakusela, Pers. interview, Nov. 17, 2000, Mtera, Tanzania
Mr John Bosco Mtega, Pers. communication, Nov. 18, 2000, Mtera, Tanzania
Mr Mathias, Pers. interview, Nov., 16, 2000, Mtera, Tanzania
Mr Edgar Mshindo, Pers. communication, Nov. 16, 2000, Kidatu, Tanzania
Mr Bertil Muhr, Pers. communication, May 23, 2000, Stockholm, Sweden
Ms Mary Narfström, Pers. communication, Oct. 20, 2000, Stockholm, Sweden
Mr Petter Narfström, Pers. interview, Oct. 20, 2000, Stockholm, Sweden
Mr Kristoffer Reinius, Pers. interview May 23, 2002, Stockholm, Sweden
- Telephone communications Mar. 5 and 9, May 25, 2005 (Stockholm), Sweden
Ms Ulla Reinius, Pers. interview, May 6, 2005, Stockholm, Sweden
Mr Björn Undrum, Pers. communication, Nov. 16, 2000, Kidatu, Tanzania
Mr Karl Henrik Willén, Pers. interview, Mar. 20, 2002, Stockholm, Sweden
Group discussion: Mr Göran Öhlund, Mr Gösta Uusitalo, Mr Jan Erik Eriksson, June 22, 1999, Porjus, Sweden

LIBRARIES AND DATABASES CONSULTED

National Library of Sweden, Stockholm, Sweden
Library of Royal institute of Technology, Stockholm, Sweden
Library of the Swedish parliament, Stockholm, Sweden
East Africana Collection, University of Dar es Salaam Library, Tanzania
Institute of Resource Assessment Library (BRALUP), University of Dar es Salaam, Tanzania
TanESCO library at TanESCO headquarter, Dar es Salaam, Tanzania
David Lubin Memorial Library, (FAO Library) Rome (<http://www.fao.org>)
British library (<http://www.bl.uk>)
Jstor.org (www.jstor.org)



[Fig. 21. Plan of the Kidatu hydropower plant, the underground station. Source: TanESCO, *The Kidatu Hydroelectric Power Plant* (Stockholm, 1975).]



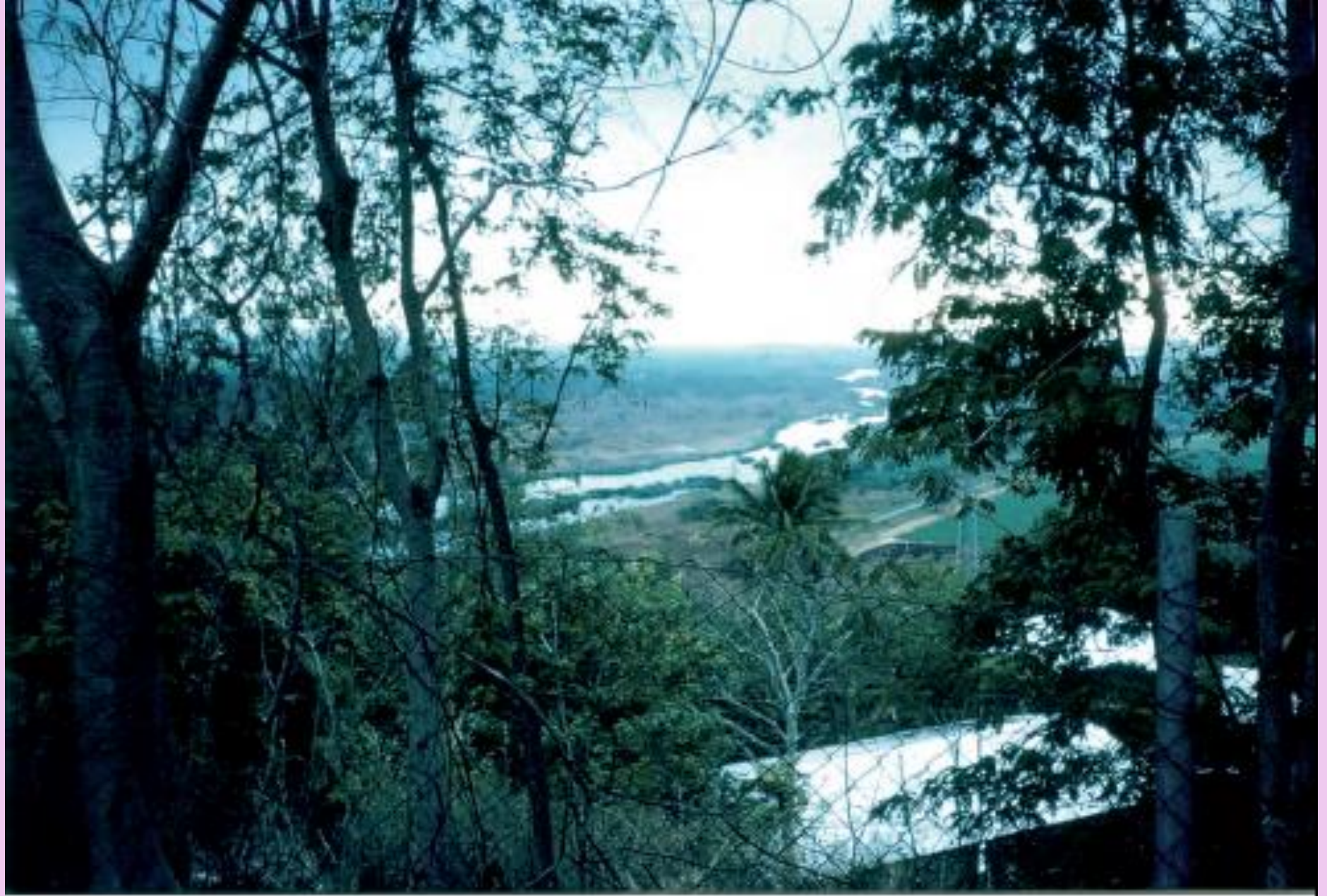
[Fig. 23. Edgar Mshindo, Dam attendant at the "intake plug", Kidatu. In the background a part of the reservoir can be seen. Photo: The author, Nov. 2000.]



[Fig. 24. Inside Kidatu power station, Joseph Mwihiwa. Photo: The author, Nov., 2000.]

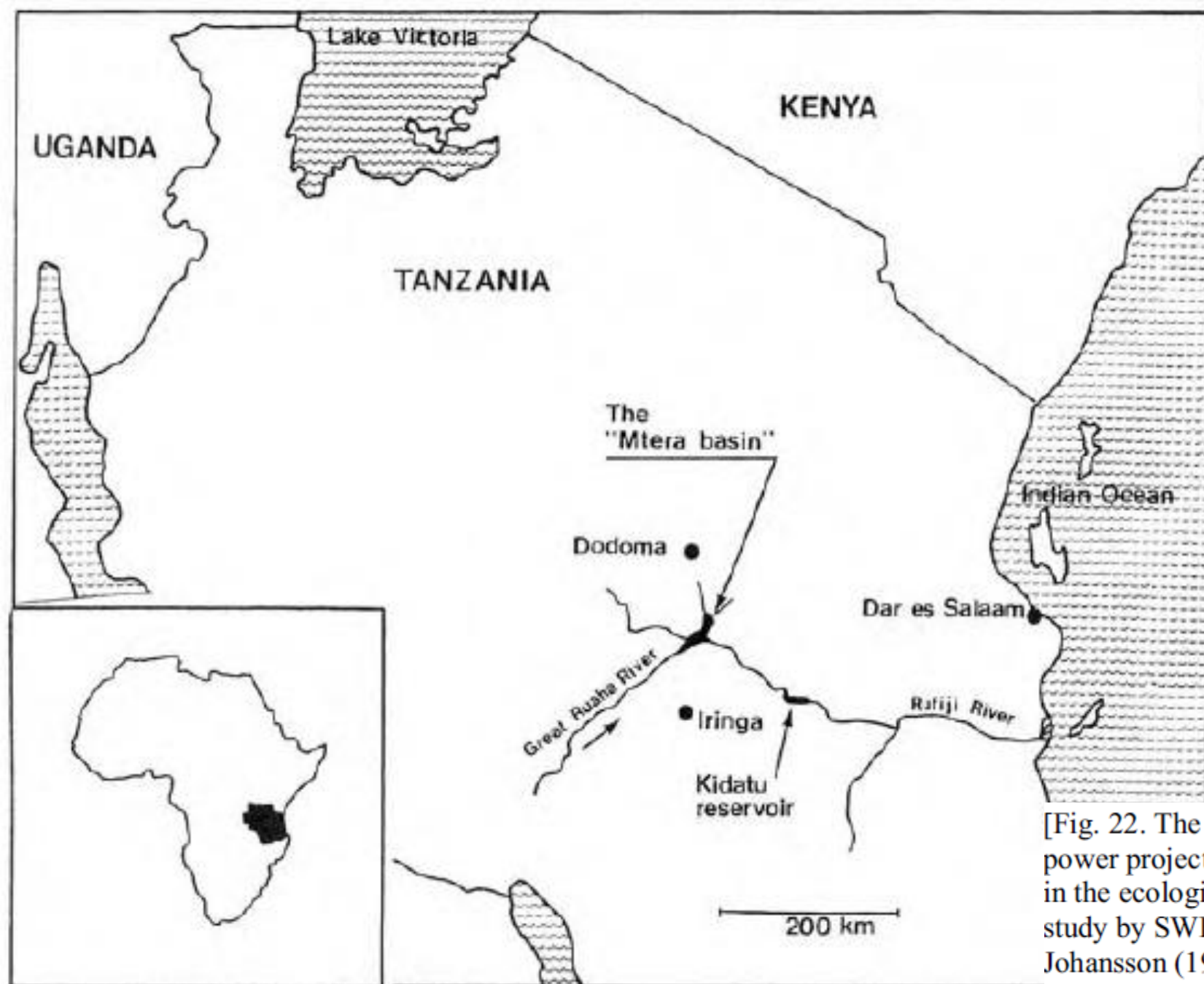


The dry riverbed at the Kidatu powerplant. Photo: M-B Öhman, Nov. 2000.

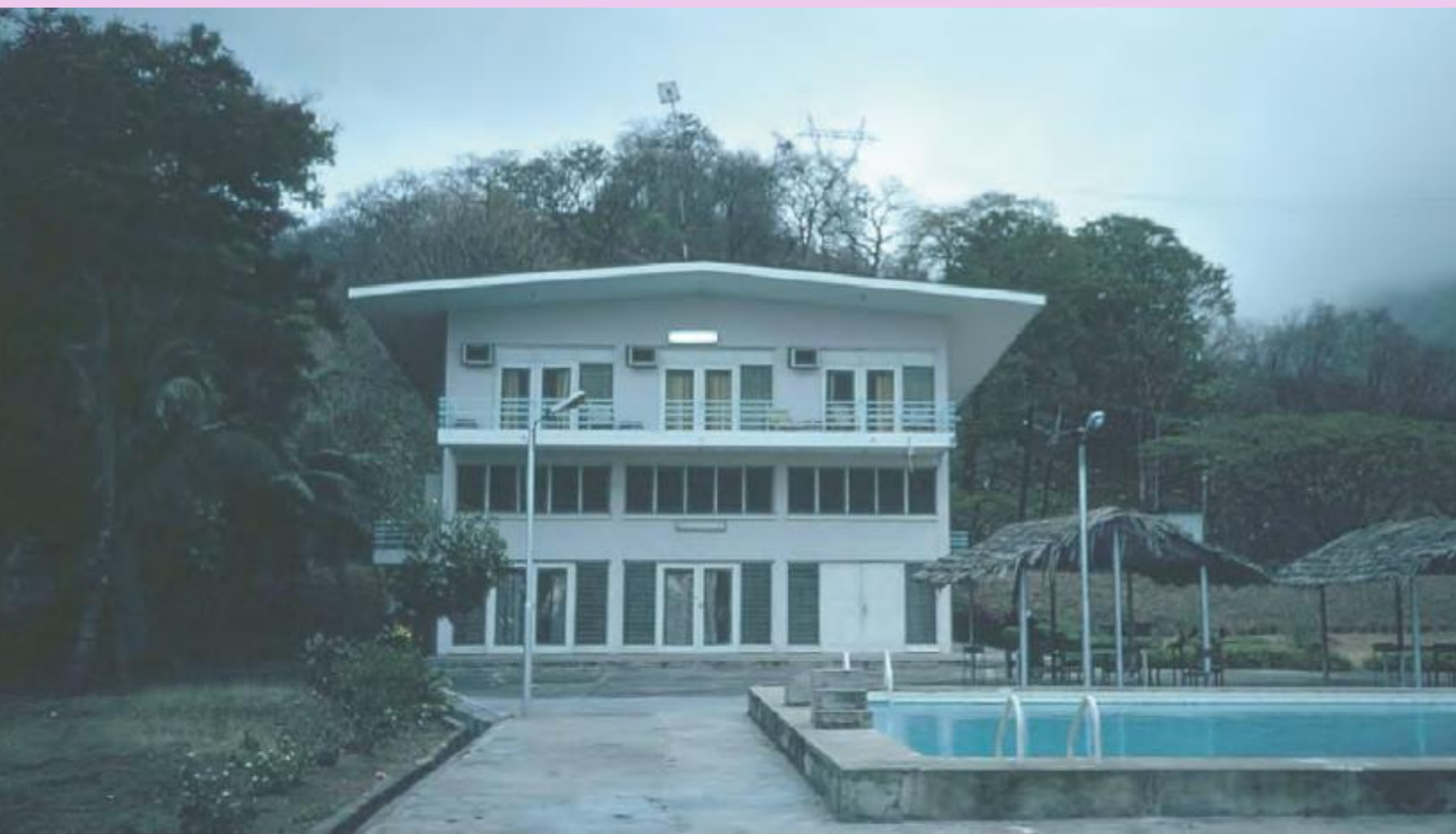


, Fig. 34.

the Great Ruaha continues its flow after resurging from the tailrace tunnel, following its way towards the coast and the Indian Ocean. Photo: The author, Nov. 2000.]



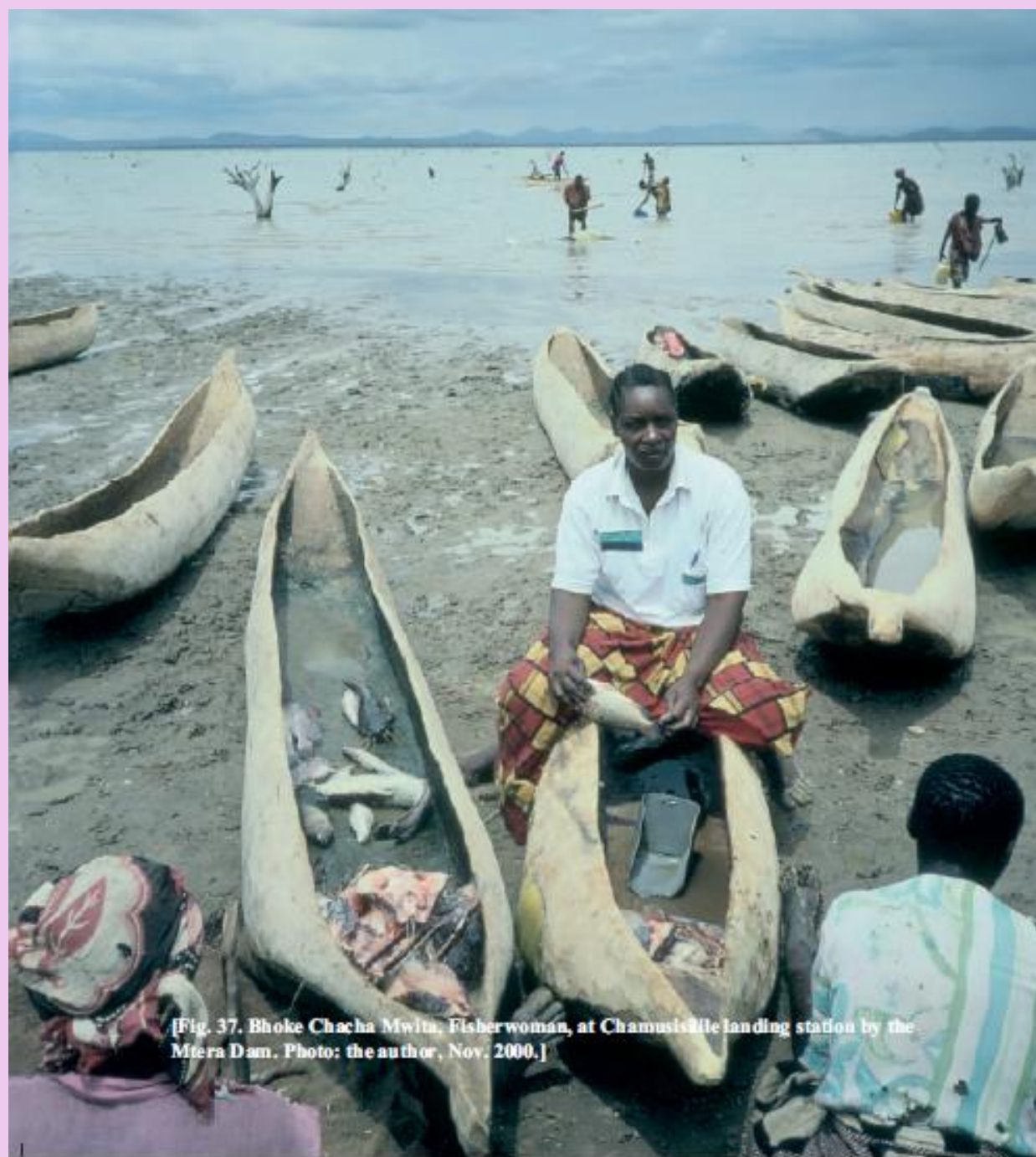
[Fig. 22. The Great Ruaha power project as presented in the ecological impact study by SWECO in Johansson (1997)]



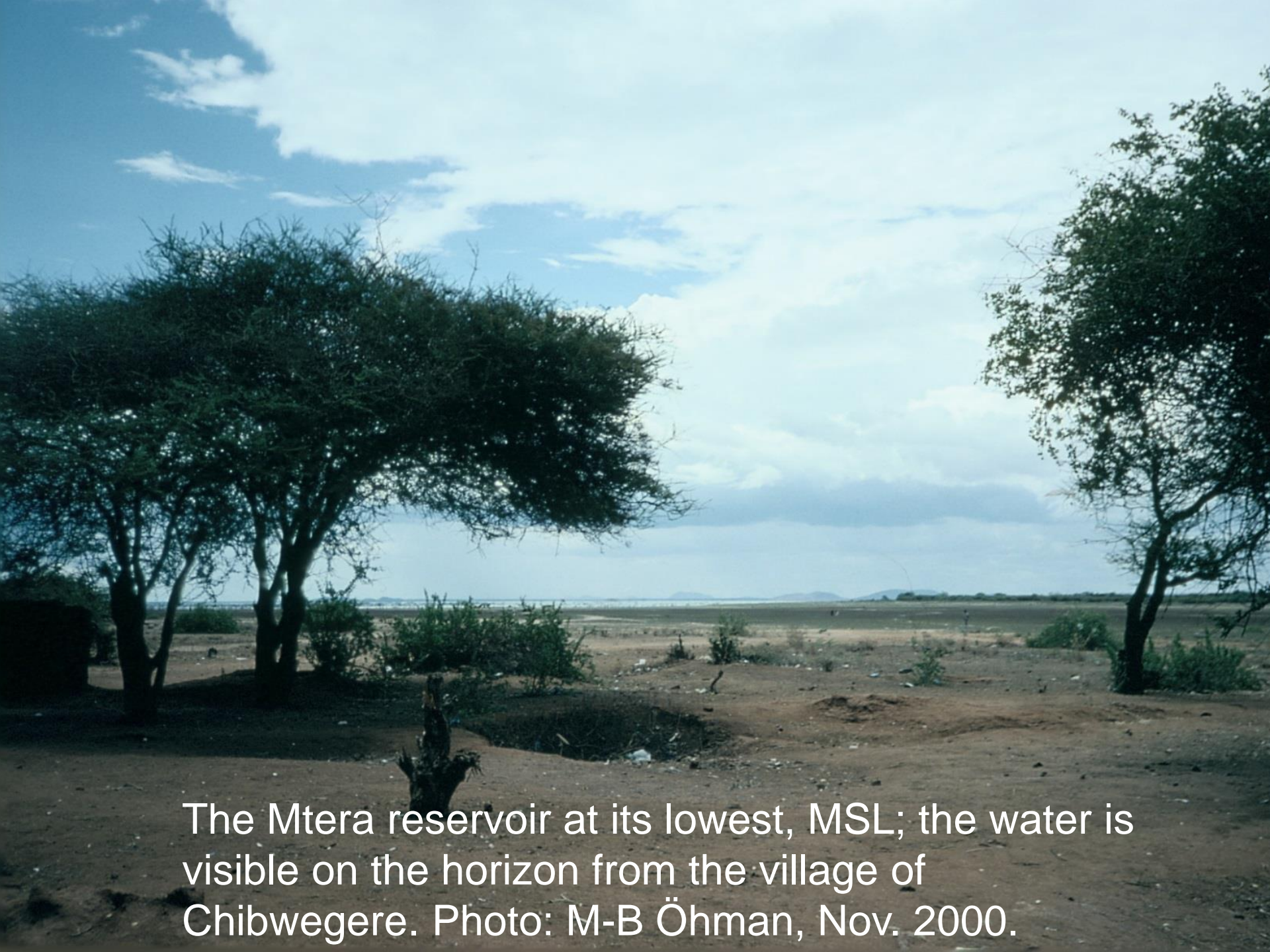
[Fig. 26. SWECO guesthouse at Kidatu, constructed in the early 1970s, where consultants (mostly from Norway and Sweden) live during their stays for repair works at the powerplant. Photo: the author, Nov. 2000]



[Fig. 27. Workers' housing, dam site camp, Kidatu. Christina Nyamhanga, and her two sons, January and Rama. Photo: the author, Nov. 2000.]



[Fig. 37. Bhoke Chacha Mwita, Fisherwoman, at Chamusilla landing station by the Mtera Dam. Photo: the author, Nov. 2000.]

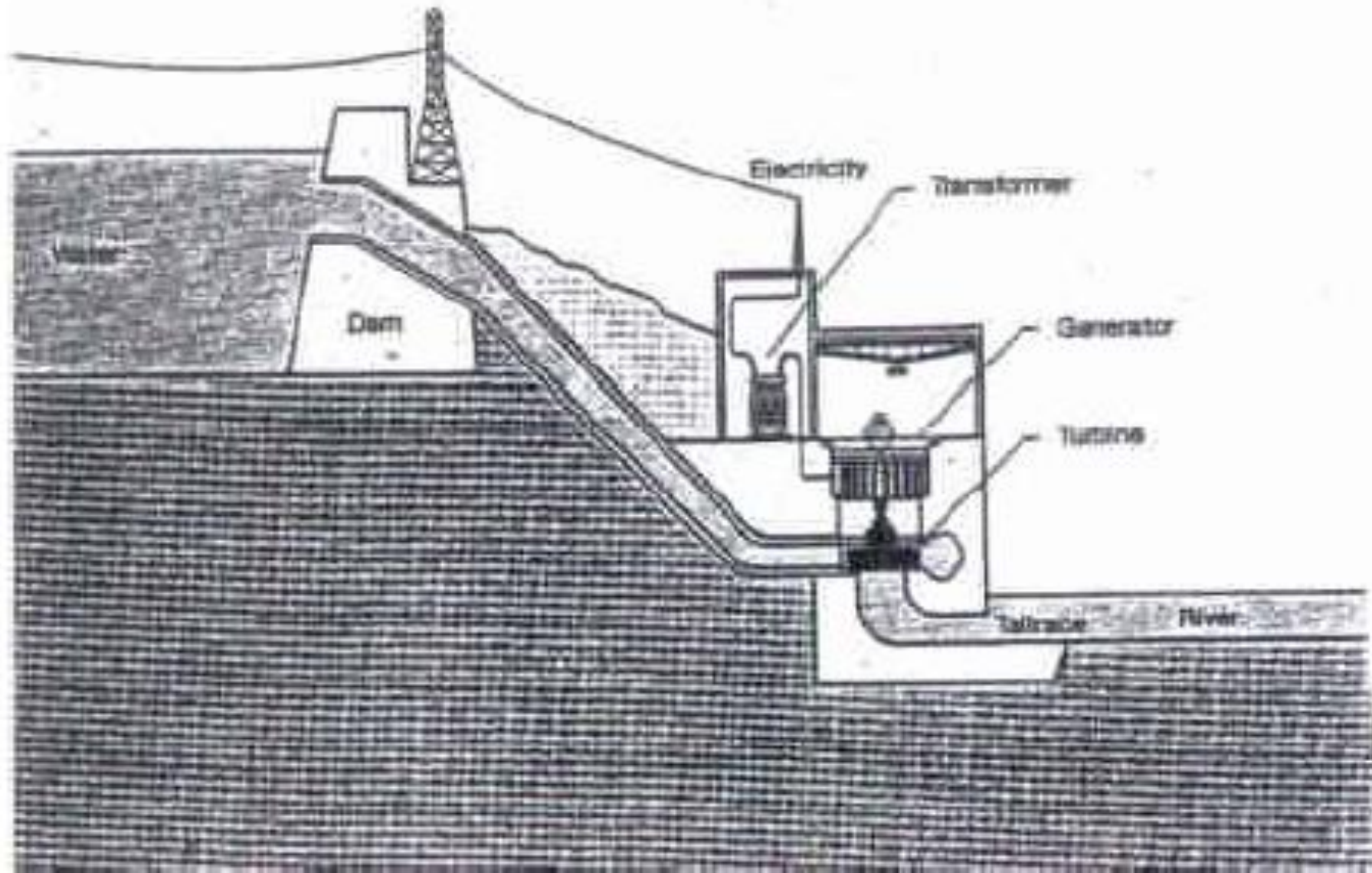


The Mtera reservoir at its lowest, MSL; the water is visible on the horizon from the village of Chibwegere. Photo: M-B Öhman, Nov. 2000.



In 1997, the water of the Mtera reservoir came all the way up to the village, destroying houses. Elias Nicklas Helile, village chairman marks the spot reached by the water. Photo: the author, Nov. 2000

WHAT IS A HYDROPOWER PLANT ?





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Technology is never "just" technology.
There is always a social part.
Sociotechnology.

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Institutional actors –
companies, states
etc.

Economic
context

Individual actors
– persons

?

?

The waters and
landscapes
involved.

Scientific
investigations

?

?

Swedish
hydropower in
export

Great Ruaha
River- Tanzania

Historic context:
After liberation
from the colonial
power– follows a
development era

?

?

Studying the Kidatu hydropower project

Institutional actors –
companies, states
etc.

Individual actors
– persons

Economic
context

Feminist technoscience

The waters and
landscapes
involved.

Scientific
investigations

Swedish
hydropower in
export

Great Ruvu
River- Tanzania

Historic context:
After liberation
from the colonial
power– follows a
development era

Postcolonial theory



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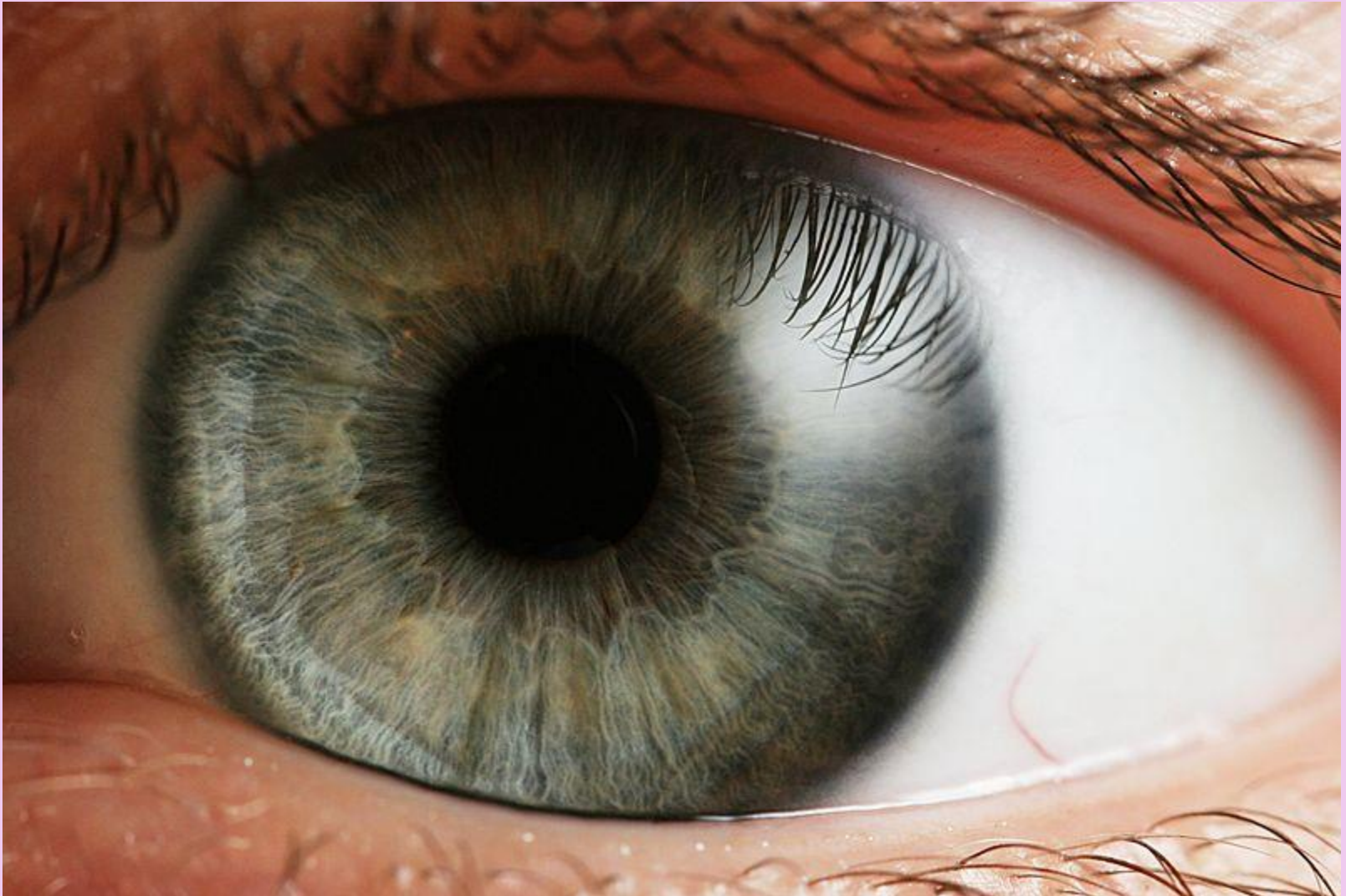
Feminist Technoscience - feminism – and the issue of "scientific objectivity"

What is "scientific objectivity"?

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Scientific objectivity as “the gaze from nowhere”





To understand **feminist technoscience** – it is important to understand the basis for the feminist movement and its relationship with academia/universities:

- WHAT is academia? What is the position of academia within in the society?
- WHO is academia?
- Whose BODIES inhabit the university?
- Students? Professors?
- Percentage of women vs percentage of men? Ethnicity? Skin colour? Ability? Geographical background? Creed? Other aspects?

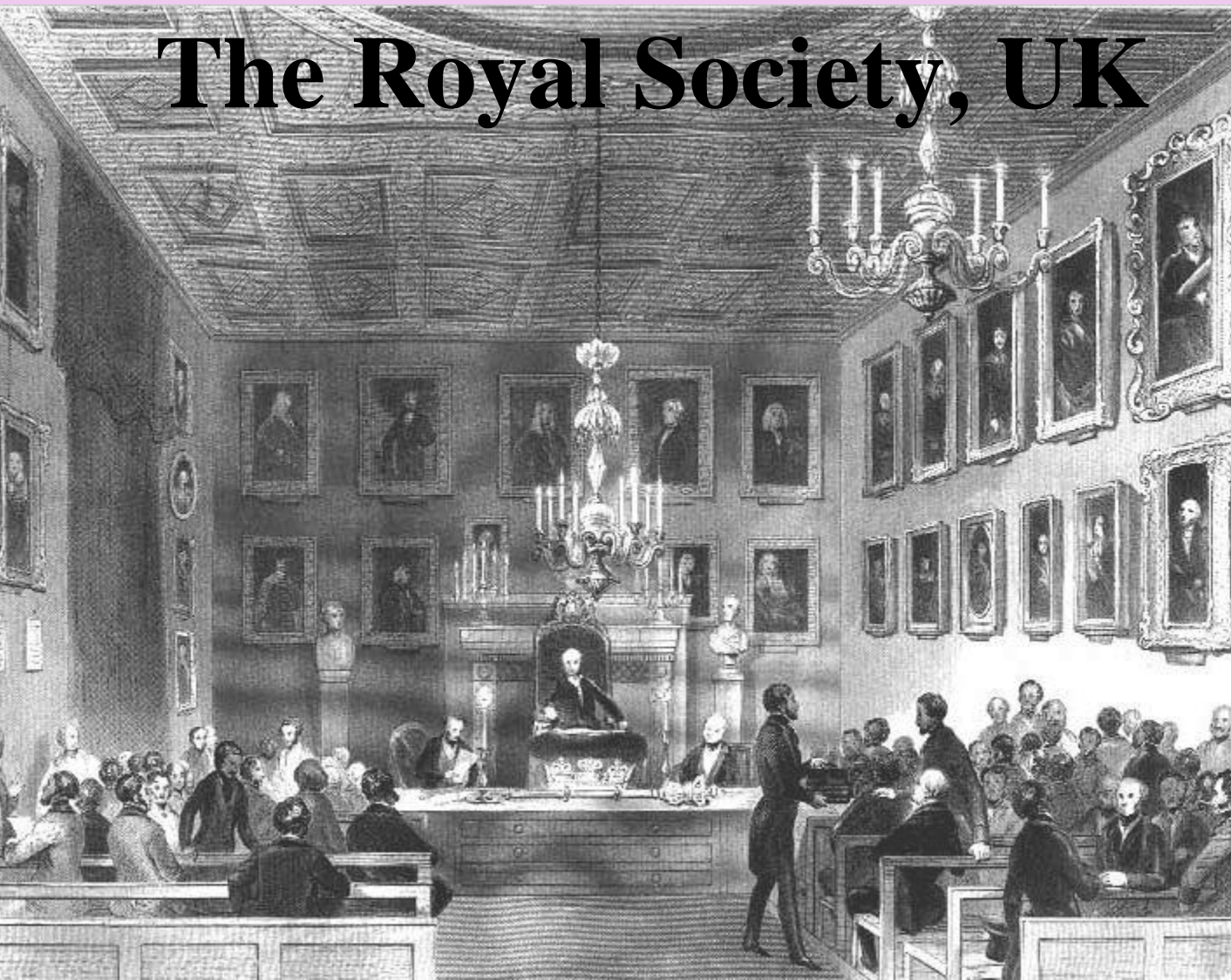
Academia = White Male dominated arenas for
knowledge production – with a specific high
status

Example:

United Kingdom royal societies

Male Dinner clubs – developing into societies –
producing scientific journals – being the places
where **science** is produced

The Royal Society, UK



*“The world’s oldest scientific publisher, with the first edition of *Philosophical Transactions of the Royal Society* appearing in 1665.”*

On 22 March **1945**, the first female Fellows were elected to the Royal Society. This followed a statutory amendment in 1944 that read "Nothing herein contained shall render women ineligible as candidates", and was contained in Chapter 1 of Statute 1.

Source:
<http://royalsociety.org/about-us/>

There are ALWAYS human bodies involved in the production of scientific knowledge – and construction of technology. It is important to identify who these human bodies are. What they look like. What they desire. What they dream of.

Feminist Technoscience

- Technology/science/society - inseparable
- A number of **actors**- persons- involved in the making of technoscience – thus depending on their specific contexts; historically, economically, culturally... (postcolonial perspectives included)
- All scientific claims/truths/myths are carried by human bodies – which provide status and meaning to them –**objectivity** thus **impossible**
- The importance of the **human body** in the making of technoscience
- There is **no innocent technoscience** – actors involved have **responsibility**, which includes me as a researcher.
- **Power analysis**

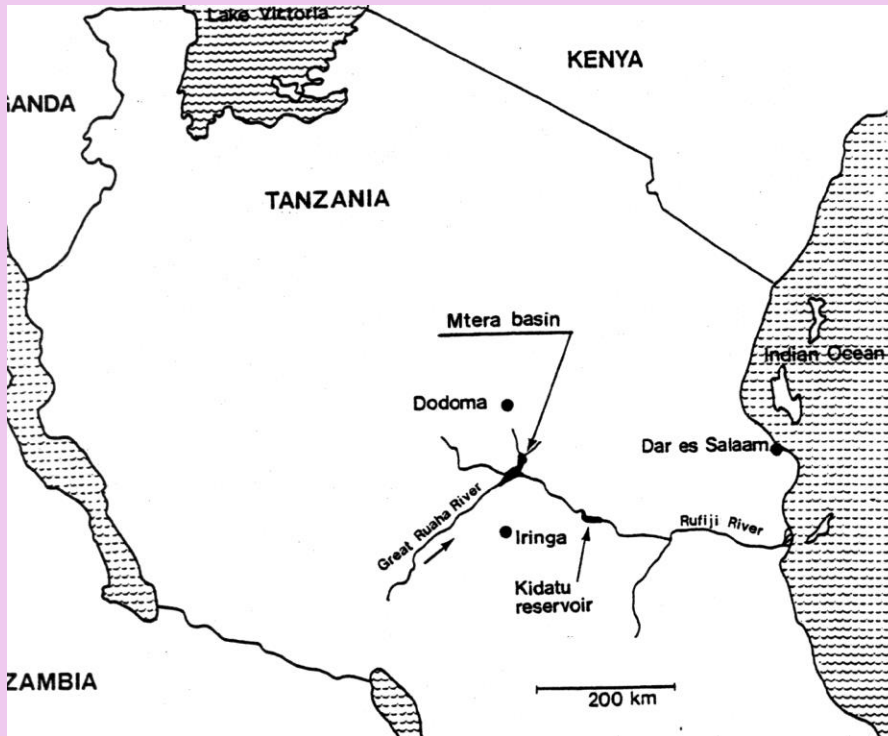
Inspiration from Haraway, Harding, Fox-Keller and many other authors/researchers doing feminist technoscience

Postcolonial theories: Mudimbe, Fanon, Saïd and others.



The Big Dam Era

- The Big Dam Era has been defined as the period since the 1950s, when the construction of large dams became the leading technology for water resource development in the world.
- A “large dam” is a reservoir with a dam wall measuring 15 metres or more from foundation to crest. Although questioned and met by much opposition, the big dam era still prevails in the 21st century. Large dams and hydroelectric projects are inherently political, as they occupy and influence large territories and they are demanding competitors for the use of water resources, especially in areas where water resources are scarce.



The Great Ruaha Power Project,
Swedish development assistance
(Sida) and the World Bank

The Great Ruaha power project in Tanzania was the first time that Swedish hydropower engineers, with the help of Swedish development assistance, managed to become the main consultants for a large-scale hydropower project outside Sweden.



But!

The Mtera reservoir was considered problematic already before it was construction.

At its deepest, it is 6 (six) meters deep!

Problems with evaporation, sedimentation, usage of water for other purposes (agriculture)



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Not unknown to the Swedish engineers! Nor to the Tanzanian authorities!

Scientific investigations – by Swedish hydrologists, engineers working with the project

Indicated problems. Problems were communicated.

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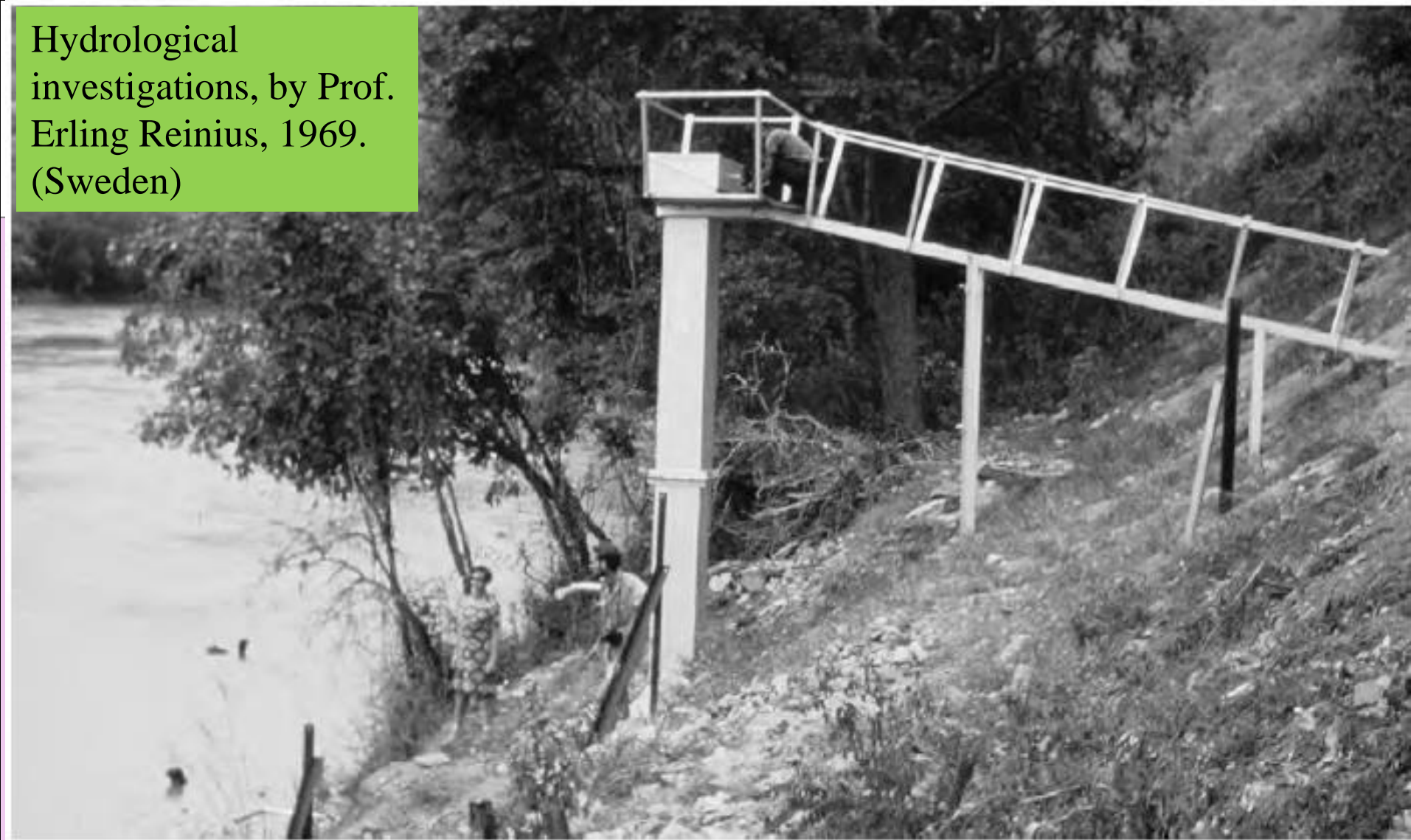
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The Swedish consultants involved in the hydropower constructions in Tanzania (Sweco)



[Fig. 44. Erling Reinius, second from the left, as he performed hydrological investigations at the Mtera and Kidatu sites of the Great Ruaha River in January 1969 for the preinvestment study. The others are probably SWECO consultants. Farthest to the right is Torben Rosendal, site manager for SWECO.¹ Photo: Ulla Reinius, Jan. 1969]

Hydrological
investigations, by Prof.
Erling Reinius, 1969.
(Sweden)



[Fig. 46. Ulla Reinius and Torben Rosendal by the gauge at Great Ruaha River. Unknown person in the gauge, site unknown. Photo: Erling Reinius, Jan. 1969. Source: Ulla Reinius private archive]

Hydrological
investigations, by
Prof.
Erling Reinius, 1969.
(Sweden)



[Fig. 47. Ulla Reinius and a local school teacher by an evaporation pan – an instrument to measure evaporation. The school teacher was involved in collecting data from the pan. ¹ Photo: Erling Reinius, Jan. 1969. Source: Ulla Reinius private archive]

Hydrological
investigations, by Prof.
Erling Reinius, 1969.
(Sweden)



Fig. 1. The Great Ruaha River in Tanzania in its calm mood, January 1969. Photo: Erling/Ulla Reinius/ private archive.

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So:

Swedish engineers did understand, and did warn about problems.

Many different problems and risks were highlighted.

But still the project went on. Some examples:

Example from negotiations; Swedish engineers (Sweco) and Tanzanian representatives (SRA, F1AB 1390, Dec.18, 1969, fr. Vattenbyggnadsbyrå, Nordström/Wretblad, t.TanESCO, F.S. Batty)

”From the result of the calculations and estimates (sic) in the Preinvestment Study it is evident that the Mtera reservoir plays an important rôle for the overall economy of the Kidatu power project. Though the question of the availability of the land to be inundated at the creation of the reservoir is not dealt (sic) with in the study, we feel that this question is rather important and it could well be that it may be subject to inquiries from the World Bank.

At discussions with both yourself and with Lwegarulila it has been tentatively concluded that the availability of land at Mtera should not give any problems, since the area is very sparsely populated and does not include any known areas of agricultural or other values. We think, however, this question should be further investigated and we would suggest you to contact representatives of possible interests involved, e.g. Agricultural, Minerals, Forest, Games(sic), etc. authorities in order to clarify the picture in case of an inquiry from the World Bank.”

Swedish authorities (Sida + Swedish government)

– negotiating with Tanzania/World Bank 1969/70

- World Bank did indeed ask for further studies regarding the inundation zone, but these studies were more gloss than actual substance.
- Furthermore, the questions about population aspects were omitted from further negotiations, as the Tanzanian planners declared the necessary relocation of people a part of the ongoing villagization (ujamaa) program and a matter for the regional authorities.
- At the negotiations in Washington, this was fully accepted by the representatives of the Swedish government.

Internal Tanzanian opposition - A. Buchanan, a senior executive engineer at the Tanzanian Ministry of Water Development and Power.

(SRA, F1AB 1393: Copy of confidential letter fr.Buchanan to Devplan/ Letter fr S. Regnell, SIDA, DSM, to SIDA, Sthlm, Feb. 23, 1972.)

”From the surface area of Mtera reservoir, full and spreading over 600 km² the annual evaporation is estimated at 1350 mil m³. The estimated average annual evaporation at 940 mil m³ will be a total yearly loss to the Great Ruaha Valley, and also probably to Tanzania, of water resources sufficient to irrigate 400 km² (or 100,000 acres).

The Balfour Beatty Report of May 1967 made allowance in their calculations for Mtera for 500,000 acres for irrigation upstream but Sweco design seems to make no such allowance. Indeed if Mtera is to go ahead as planned it will be necessary to restrict all new water usage in the basin – an area extending from Itigi in the North to Njombe in the South, West to Mbeya and East to Iringa in order to feed this wasteful Mtera reservoir.”

Swedish engineer voicing criticism to Sida (1972 during construction)

“Ministry WD & P:s letter 8.6.1972 to Tanesco. It is a severe criticism of the whole Kidatu project. (...) The problem is as I have earlier suggested that the entire regulation level of the Mtera reservoir cannot be used in view of the negative impacts on the environment. In my opinion we will now have to look around for other reservoirs, even if smaller, upstream of Kidatu which besides providing a regulation volume lost from Mtera also possibly would provide for electricity from new power stations. For these new reservoirs, the evaporation would be less in relation to the volume of the reservoir.”

Sida/Swedish official response – more money to the project, for Swedish researchers on ecological impacts – problem solved

”For some years numerous meetings have been held with a specific ecological committee.(...)SIDA has sent observers to the meetings. The problems of coordination have been great and the only concrete result that has been achieved is a general acceptance of further investigations.

On a regional level it is said that there will be no problems related to the construction of a reservoir of this size. It would only be an advantage for a region with great water scarcity during most part of the year.

Also the displacement of people that will be required are considered easily dealt with.(---) As the construction of the Mtera dam may bring along great problems of erosion, it is of great importance that the issue of ecology is dealt with so that preventive measures can be made at an early stage.”



So:

Swedish engineers did understand, and did warn about problems.

Many different problems and risks were highlighted.

But still the project went on. Why did this happen do you think?



How come

Sweden in 1970 ventured into a project of constructing a hydropower plant in Tanzania, at the cost of of 69 billion SEK in bilateral credits – the biggest credit ever in Swedish development assistance?

All this money was spent, but still the hydropower system has severe short comings and also negative impacts on environment, agriculture and health?



My understanding

A Swedish Development Assistance paradigm combined with a Swedish Technoscientific Paradigm.

The main objective of Swedish development assistance was NOT to provide for "development" for Tanzania, but to promote the export of Swedish hydropower construction.



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The basis for Swedish development assistance in my analysis

Altruism AND commercial interests

Altruism on the basis of a constructed world-view – the poor and passive people in far away countries in desperate and urgent need for help - colonial imagery (the white man's burden) and colonial practices

Continuation of colonial practices – i.e. Swedish internal colonisation through hydropower exploitation in the north (Sapmi) – the state owns the territory and is free to do what it wishes to, without taking into account local inhabitants rights

The perception of modernity - large scale hydropower is equal to progress, and all other voices are to be silenced

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”Sweden Helps” campaigns

1955 och 1961 – national fundraising campaigns
– the purpose was to convince the Swedish
people of the necessity of providing Swedish
state funded development assistance

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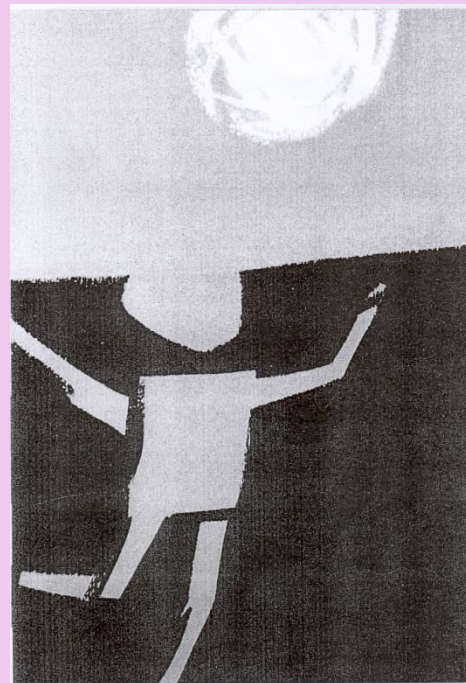
1955, 24 page pamphlet
distributed to all involved
NGOs “Welfare and
Destitution in the World”

*“Our effort is needed to lift the
poor peoples out of their
humiliating destitution and to
create a safe and peaceful future
for ourselves and our children.
This is the hour of destiny of our
generation.”*

Sverige hjälper

postgiro

901961





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A Swedish development assistance paradigm:

- The idea of a Swedish technological and scientific supremacy over the “underdeveloped” countries,
- Support of the export of Swedish technology
- Together with a dichotomous world view in which poor peoples should be helped to better lives through the introduction of the Swedish, “non-colonial technological know-how”.
- Denial of the Swedish state as a colonizer/ Promotion of Sweden as “non-colonial” – better than the others

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Swedish hydropower goes international –(due to decline in Sweden)

Merger between technoscientific paradigm and development assistance paradigm

Tax funds used to promote the export of Swedish hydropower technology

Today, Sweden is a major hydropower actor on the global market – most credits involved is channelled through development assistance

Sweco an important company on the international market.

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The Mtera reservoir, November 2000.
Photo: May-Britt Öhman



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Thanks for your attention!

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